Government of Saskatchewan

Annual Report 2002-03

State of Drinking Water Quality in Saskatchewan

Saskatchewan Environment

Saskatchewan
Our Future is Wide Open

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Letters of Transmittal

July 2003

The Honourable Dr. Lynda Haverstock
Lieutenant Governor
Province of Saskatchewan

Your Honour:

As Minister for Saskatchewan Environment, it is my pleasure to submit the State of Drinking Water Quality Report.

Respectfully submitted,

Buckley Belanger
Minister

The Honourable Buckley Belanger
Minister of Environment

Dear Sir:

I respectfully submit to you the annual State of Drinking Water Quality Report for the year ending March 31, 2003.

The 2002-2003 report describes the drinking water related goals and objectives of departments and agencies involved in drinking water and source protection activities in Saskatchewan. It details the actions taken to protect and enhance drinking and source water quality and thereby the health and economic well being of Saskatchewan's citizens. The report identifies key results of water quality monitoring and key strategies to deal with water quality in the future.

Saskatchewan Environment welcomes the opportunity to report on the actions and accomplishments in water management over the last fiscal year. It is my hope that this document will be a useful aid in understanding how the Government of Saskatchewan has focused on attaining a sustainable, reliable, safe and clean supply of drinking water that is valued by the citizens of Saskatchewan.

Respectfully submitted,

Lily Stonehouse
Deputy Minister
Saskatchewan Environment

Executive Summary

This document reports on the status of drinking water in Saskatchewan for the April 1, 2002 to March 31, 2003 period in fulfillment of the legislated annual reporting requirements found within *The Environmental Management and Protection Act, 2002*. The report also outlines the performance and actions taken by the Government of Saskatchewan departments and agencies involved in implementing the Long Term Safe Drinking Water Strategy (LTSDWS) and attaining the government's vision for a sustainable, reliable, safe and clean supply of drinking water that is valued by the citizens of Saskatchewan. In general monitoring of drinking water quality and inspection of waterworks showed improvements in water quality and the systems themselves.

The 2002/2003 fiscal year marked the implementation of change and expansion of water management legislation and programming in Saskatchewan. Saskatchewan Environment's (SE) regulatory role was strengthened and expanded. The role of Saskatchewan Health (SH) and Health Regions (HR) was reviewed and clarified in conjunction with legislative changes affecting water management. SaskWater was refocused as a water utility and the Saskatchewan Watershed Authority (SWA) was created with a broad mandate of watershed and aquifer protection. These changes were influenced by events in Canada and Saskatchewan, notably the tragedy in Walkerton, Ontario in spring 2000 and an outbreak of *Cryptosporidiosis* in North Battleford in spring 2001. Improved water management was based on strategic planning through the development of the province's LTSDWS Plan and in response to the North Battleford Commission of Inquiry.

High quality drinking water is paramount in protecting human health and sustaining economic development in Saskatchewan. Monitoring drinking water supplies is a requirement of permits or approvals for public, semi-public and certain larger privately operated water supplies in the province.

During 2002/2003, the results of bacteriological water quality monitoring for SE regulated waterworks show that 99.8 per cent of the required water samples (21,995) were submitted by SE regulated waterworks. Of these samples, a total of 778 valid regular samples were positive (3.53 per cent) for total coliform, fecal coliform or background bacteria above SE's legislated microbiological water quality standards. Twenty-eight SE regulated waterworks had more than 25 per cent of their regular samples test positive for some form of bacteriological content. Submission of routine bacteriological samples has increased by approximately 23 per cent since the 1999/2000 fiscal year, being a good indicator of the overall success of measures taken to improve monitoring and thereby ensure the safety of water supplies across the province. Compliance with bacteriological water quality standards is a meaningful indicator of acute drinking water quality on more of a waterworks specific basis. During 2002/2003, 84.6 per cent of SE regulated waterworks met the bacteriological water quality standards at least 90 per cent of the time. This is a significant improvement from 1999/2000 when 71.3 per cent of regulated waterworks met this requirement.

Disinfection by chlorination is one of the key barriers to the spread of waterborne disease. Continuous disinfection is a regulatory requirement for SE regulated waterworks. During 2002/03, 558 out of 601 SE regulated waterworks reported free chlorine residuals (facility compliance rate of 92.8 per cent). More than 83 per cent of the submitted sample results met the minimum requirement for free chlorine. During 2002/2003, 554 out of 601 regulated waterworks reported total chlorine residuals (compliance rate of 92.2 per cent). More than 84 per cent of the reported results met the minimum requirement for total chlorine. In overall terms, during the 2002/2003 fiscal year, 68.7 per cent of regulated waterworks met SE's disinfection requirement 90 per cent of the time. This is a significant improvement since 1999/2000 when 46.3 per cent of SE regulated waterworks met SE's disinfection requirements.

Turbidity is an indicator of water treatment efficiency. New water quality standards for turbidity were introduced in 2002/2003 and will be phased-in over the next four to six years depending on the size of facility. Of the 206 facilities reporting turbidity monitoring data in 2002/2003, 181 facilities reported 5,842 of the 7,273 turbidity results to be less than the Maximum Acceptable Concentration (MAC), for a compliance rate of 80.32 per cent.

Trihalomethanes (THMs) are generated during the water treatment process as a by-product of free chlorine reactions and are an important water quality indicator. Standards for THMs will be phased-in over the next six to eight years depending on the size of the facility. During 2002/2003, 78.3 per cent of the required water qualities monitoring samples were submitted by SE regulated waterworks. Forty-nine per cent of the waterworks submitting samples met the future THMs regulatory requirement of 100 micrograms per Litre (mg/L).

Health and toxicity (H&T) related chemicals are a grouping of parameters of health significance to drinking water consumers. These contaminants may be naturally occurring, or they may be introduced into drinking water by human activities. Standards for health and toxicity related chemicals were introduced in 2002/2003 and will be phased-in over the next six to eight years, depending on the size of the facility. During the 2002/2003 fiscal year, 47 per cent of SE licensed waterworks submitted samples, however sample submission at the majority of these waterworks is only required once every two years. Ninety-three per cent of these waterworks met the drinking water quality objectives for H&T related chemicals.

SE developed and implemented an expanded waterworks inspection protocol during 2002/2003 and 788 inspections were conducted during the fiscal year which surpassed the inspection schedule. These inspections revealed that 90 per cent of waterworks were in a clean and orderly condition, 90 per cent of water supply reservoirs were in good condition, daily monitoring of free chlorine residual was consistently performed at 78 per cent of waterworks, continuous disinfection was employed at 93 per cent of waterworks and 81 per cent of waterworks had free chlorine levels leaving the water treatment plant that met regulatory requirements. In all instances where shortcomings were found, either through inspection or routine monitoring, follow-up actions were directed by SE staff. Directed follow-up included 1,600 verbal warnings (inspection form note for action), 63 precautionary drinking water advisories and six written warnings or notices of violation.

Precautionary Drinking Water Advisories (PDWAs) and Emergency Boil Water Orders (EBWOs) are formal notifications for action issued by SE or Health Region (HR) to waterworks owners upon the discovery and verification of problems associated with water quality or waterworks operation. At the outset of the reporting period, there were 47 PDWAs and two EBWOs in effect. During the same period, 46 PDWAs and 17 EBWOs were issued and 38 PDWAs and 12 EBWOs were rescinded. At the end of the reporting period, 55 PDWAs and seven EBWOs were in effect. PDWAs and EBWOs are an effective means to deal with problematic water quality and thereby ensure the safety of consumers served by these supplies.

SE regulated waterworks are required to meet minimum water treatment requirements as a means to ensure water quality and thereby the health of the consumers served. As of March 31, 2003 there were 21 surface water based waterworks and eight groundwater based water supplies that failed to meet SE's minimum treatment requirements. Six communities were removed from the listing of waterworks not meeting minimum treatment requirements during the fiscal year. PDWAs were in place for the periods that these systems failed to meet minimum treatment requirements.

The majority of the public water supplies regulated by HR, under *The Health Hazard Regulations,* provide water to facilities that operate only during the summer months (i.e. campgrounds, tourist accommodations). Currently HR public health inspectors are just commencing to develop a registry of these types of systems and to inspect and assess each system and to ensure compliance with the regulations. In future annual reports, SH will include more detailed information on these types of systems. In the interim period, SH has protocols in place to act quickly to protect the public's health should a water test result for a sample taken from a public water supply regulated by SH indicate the water is not safe.

Operator training is an important element of ensuring the safe operation of waterworks and improving the quality of drinking water supplies across the province. SE introduced mandatory operator certification requirements in July 2000 with a five year phase in period. An Operator Certification Board (OCB) was formed in 2000 with the mandate of reviewing and issuing operator certifications. In December 2002, *The*

Water Regulations also created the requirement for ongoing operator education as a condition of re-certification. As of the end of the reporting period, there were 217 waterworks licensed by SE with an operator certified to some level. Ninety-two waterworks were in full compliance with the operator certification requirements. Records of the OCB indicate that 426 operators were certified as on March 31, 2003, a significant increase since December 2001 when 164 operators were certified.

In terms of infrastructure assessment and project funding, there were significant activities during the 2002/2003 fiscal year. SE developed a waterworks safety assessment protocol, which will be implemented in the next fiscal year as a means to determine the relative status of waterworks and aid in determining which works need improvement.

Saskatchewan Government Relations and Aboriginal Affairs (GRAA) administer programs which provide infrastructure support for municipalities. Programs, which fund infrastructure improvement, include the Canada-Saskatchewan Infrastructure Program (CSIP), the Northern Water and Sewer Program and the Emergency Repair Program. In 2002/2003, 74 water supply projects and 28 sewer projects were approved in southern municipalities and another 12 water and sewer projects were approved in northern communities under the CSIP. The total provincial and federal funding committed for these projects under CSIP was $22.3 million. Under the Northern Water and Sewer Program, $6.3 million was spent in 2002/2003 on developing and upgrading water and sewer systems in 27 communities the north. Also in 2002/2003, under the Emergency Repair Program $199,000 was spent on 12 water and sewer projects.

The Municipal Financing Corporation offers loans to municipalities for upgrading of water and wastewater infrastructure. During the 2002/2003, there were 13 projects totalling $2,563,572 financed by the Corporation for upgrading of waterworks or related infrastructure.

SaskWater was reorganized as part of the LTDWS effective October 1, 2002 with proclamation of *The Saskatchewan Water Corporation Act, 2002*. The new SaskWater mandate is to provide water, wastewater and related services to municipal, industrial, government and domestic customers in the province on a commercial basis. SaskWater owns and operates three stand-alone water treatment plants and two larger plants that produce treated water for the Wakaw-Humboldt and Codette Lake (Melfort) regional systems in central Saskatchewan. Since October 2002, the corporation bought, upgraded and operates the water treatment system in the Village of Edenwold. SaskWater also enlarged its Saskatoon North treated water system, undertaking a $2.6 million expansion of the system to the Town of Hague.

SWA was created October 1, 2002 with a goal to provide sustainable water supplies and healthy watersheds. Key activities of the Authority include: watershed and aquifer planning; watershed monitoring; infrastructure management; regulation and licensing for water use; water dispute resolution; and water education and information. It will also enter into public and private partnerships to deliver watershed stewardship and ecosystem protection.

The Environmental Management and Protection Act, 2002 that was proclaimed on October 1, 2002 resulted in the transfer of waterworks and wastewater works licensing responsibility entirely to SE. Over the October 1, 2002 to March 31, 2003 time period, SE issued 20 Permits to Construct Waterworks. There are also another 13 construction permits pending as of the end of the fiscal year. The total cost of these projects is estimated at $6,850,000. The cost of projects applied for but not yet permitted is estimated at $7,481,000. In the first half of the fiscal year, SaskWater issued 31 Approvals to Construct Works for water and wastewater projects.

The Environmental Services (ES) section of the Provincial Laboratory (PL) provides analytical services for a wide range of bacteriological, chemical and physical testing of waters in Saskatchewan. Since the waterborne disease outbreak in Walkerton, Ontario in May 2000, there has been an increased demand for water quality testing from the general public (i.e. individuals who use private wells and dugouts as a source of drinking water) and from publicly operated drinking water facilities. The PL has seen an 80 per cent increase in the number of samples submitted for bacteriological analysis of drinking water. During the period of time April 1, 2002 to March 31, 2003, the ES section of the PL carried out in excess of 91,000 tests on the 47,000 samples submitted for bacteriological analysis of drinking water.

The Water Regulations 2002, which came into effect in December 2002, marked the introduction of new requirements for mandatory laboratory accreditation in accordance with nationally accepted standards. All laboratories that provide analysis of drinking water samples as required by SE Minister's Approval or Permit to Operate must be accredited by March 31, 2004. As of the end of the fiscal year, two of the five laboratories performing analysis of water samples were accredited; the remainder were in the process of attaining accreditation. Accreditation ensures that laboratories provide high quality and representative analytical results that reflect the true quality of drinking water.

The province implemented the Rural Water Quality Advisory Program in 1997 to provi de opportunity for testing of water supplies for rural residents. The Water Quality Services office of the SWA continues to provide this service. In 2002, 550 clients were served and indications are that annual demand is slowly growing. This demand appears to be a function of both growing program awareness and growing awareness of the central water quality issues in the province by the rural public at large. The analytical data obtained over the duration of the program reveals a broad variation in the quality of rural water supplies from untreatable to very good. Further, the accumulated data has provided initial indications that some important health issues, such as excessive arsenic concentrations, exist in groundwater sources in several areas around the province.

The 2002-2003 fiscal year marked the initial development of a new integrated provincial water quality information system - Environmental Management System (EMS) as committed to in response to the North Battleford Commission of Inquiry and commitments made by government in the LTSDWS. The EMS is a series of integrated data and information components that assist in the delivery of core water business activities. It is designed to support the Regulatory Business (administering legislation) and the Assessment Business (determining the state of the waterworks operations). A common data repository is provided so the information collected by different business processes and business areas may be shared. EMS is able to identify waterworks not meeting compliance standards listed on their permit to operate, and will pass this information electronically onto regulatory agencies for action. EMS will be available for SE regulatory and inspection staff use in May 2003. Additional modules will be developed in the future.

The development of the public Web site (www.saskh2o.ca) for the Saskatchewan Water Information Management (SWIM) initiative was the responsibility of a Public Access Committee, lead by the Information Technology Office. SaskH_2O.ca is intended to become a citizen-focused Web site that brings together under one web address, information and services available from the government that relate to water, regardless of the department or agency that produces the information or offers the service. Its primary target is the public seeking information about the quality of the community's drinking water. It is anticipated public web access to drinking water quality information will "Go Live" late spring, 2003.

In order to support the HRs in administering *The Health Hazard Regulations* sections addressing public water supplies, SH is developing a data management system that will capture information specific to public water supplies. This system will form part of the current Public Health Inspector Information System (PHIIS) that is used by HR public health inspectors during their activities in other public health program areas (i.e. public eating establishments). The system will connect with the PL's Laboratory Information Management System (LIMS) system and will enable linkages of water test results specific to SH's regulated public water supplies. In addition, the system will capture information relating to water source type, system size, treatment, tests and compliance information. The PHIIS water system, expected to be fully implemented by August 2003, will provide information to the SaskH_2O Web site and other interested government agencies.

During the first six months of its existence, SWA focused its energies on four main areas: establishment, delivery of ongoing programs, development of future plans and development of its Watershed and Aquifer Planning Model. Watershed and aquifer planning will be a key activity in protecting source water. SWA planners will work with communities in watersheds to identify threats to water quantity and quality and agree on appropriate steps to reduce or eliminate those threats. The first watershed planning exercises will be initiated during the 2003/2004 fiscal year. State of Watershed Reports have also been identified as a very important new program. These reports will document the health of each watershed and will serve to monitor progress in improving water supplies. SWA has several programs to assist landowners

in improving their stewardship and thus protecting water, including the Prairie Stewardship Program aimed at protecting native prairie, streams and wetlands. The authority also leads the Prairie Water Care initiative, a volunteer water-monitoring program, designed to increase public awareness of the factors affecting water quality.

Maintaining the infrastructure necessary to meet water supply needs is a critical aspect of source water protection. SWA is responsible for the operation and maintenance of 45 dams, approximately 130 km of conveyance channels and other water management infrastructure throughout the province. During the fiscal year of 2002/2003, SaskWater and SWA spent approximately $ 5.4 million on dam safety and project rehabilitation work. Work was completed on the Avonlea Dam, significant rehabilitation work was undertaken at Rafferty Dam and initiated at Alameda Dam. Further rehabilitation work was also undertaken at six structures across the province and dam safety investigations and project designs were also furthered at 10 other dams and structures in the province.

The quality of our ambient water resources is an important factor in assessing the viability of the water for any number of uses. One emerging tool, which will be of increasing value over the years, is the Saskatchewan Water Quality Index (SWQI). Although yet to be applied directly to surface water used as raw drinking water supplies, the SWQI is also a good indicator of quality for this use. Application of the SWQI to the South Saskatchewan River for the Protection of Aquatic Life category for the years 1990 to 2000 provided numerical ratings for the river ranging from 85.6 to 98.8, which correlate to Good to Excellent conditions for the protection of fish and other aquatic life. Application of the SWQI for the entire North Saskatchewan River for the Protection of Aquatic Life category and for four stations on the river, respectively, for the period 1990 to 2001 provided numerical ratings ranging from 88.5 to 100.0, which correlate to good to excellent conditions for the protection of fish and other aquatic life in this waterbody. Application of the SWQI to the Qu'Appelle River for the Protection of Aquatic Life category over the period 1990 to 2000 provided ratings ranging from 72.1 to 82.1, corresponding to a description of Fair to Good condition. In the case of the Qu'Appelle River, there are some factors that may occasionally impair the water for use by aquatic life. These likely relate to inputs of treated wastewater along the system, or periodic declines in dissolved oxygen levels due to the decomposition of aquatic plants

Saskatchewan Agriculture, Food and Rural Revitalization (SAFRR) made significant progress on a number of initiatives during 2002/2003 that aid in the protection of source water quality in the province. Activities include ongoing approval of waste storage and waste management plans for Intensive Livestock Operations (ILOs), establishment of the Spirit Creek Watershed Monitoring Committee, cooperation with SE to monitor surface water near selected ILOs across Saskatchewan and along with staff and program funds from the SWA provided assistance to demonstrate the effectiveness of relocating extensive and intensive livestock operations away from creeks and rivers. Other projects include pesticide applicator licensing, funding research projects through the Agricultural Development Fund that focus on the long-term sustainable storage and management of manure and signing of the federal/provincial Agriculture Policy Framework which will lead to significant resources being dedicated to environmental initiatives, including the reduction of agricultural risks to the health and supply of water.

Saskatchewan Government Relations and Aboriginal Affairs (GRAA) also had a number of initiatives during 2002/2003 which were aimed at improving source water protection in the province. Legislative changes to *The Planning and Development Act, 1983* require that all municipalities have in place bylaws and water protection plans to protect drinking water supplies by 2007. GRAA also assisted in the development of a model zoning bylaw for intensive livestock operations that includes municipal authority to address water source protection.

During the 2002/2003 fiscal year, a number of initiatives were developed to provide the public with increased access to information on drinking water. An inter-departmental Water Communications Committee was established to better focus planning and implementation of water education activities among the different agencies. A brochure From Source to Tap was produced and widely distributed to residents of the province. A group called the Public Access Committee, representing various government agencies, participated in the development of a SWIM Web site designed to bring together at one site, information on government programs and services relating to water. Project Wet, an educational program

for teachers, now housed within SWA and supported by the Canadian Water Resources Association and Saskatchewan Learning continued to train facilitators around the province. Project WET was also promoted at a number of tradeshows held this year.

During the fiscal year, SE delivered in excess of 25 public presentations at various events and venues aimed at consulting or informing its clients and the public on various drinking water issues related to legislative and regulatory changes and new protocols and activities. A television Public Service Announcement (PSA) was produced and distributed on the disposal of household hazardous wastes in a way that protects water. At the end of the fiscal year, the 2001/2002 Drinking Water Compliance report was released to communities and the public outlining overall compliance of Saskatchewan's municipal water systems and showing significant improvements in meeting drinking water quality objectives. SWA also consulted with 17 partners to support the development of future plans and activities of that newly formed agency. The Authority explained its mandate at six tradeshows and to 14 groups during the fiscal year. During the fiscal year, GRAA informed key municipal stakeholders and the general public about the provincial government's drinking water strategy and the municipalities' responsibility for ensuring that their citizens have safe drinking water. These messages were provided through ministerial speeches at municipal association meetings and other events.

Public opinion research for SE during 2002/2003 revealed Saskatchewan residents consider water quality the second most important environmental issue in their community.

SWA manages a toll-free inquiry line (1-866-SASK H20) to provide general information and a referral service in response to public inquiries on all water-related issues. From implementation of the toll free line in June until the end of the fiscal year, 258 calls were handled. The inquiries received ranged from issues dealing with water quality and testing, treatment, storage, supply and distribution, the Rural Water Quality Program, the Pumping Equipment Program and hook ups to municipal systems.

During the 2002/2003 fiscal year, SE developed and revised a significant number of guidelines and standards as a means to aid waterworks owners and operators understand and implement the requirements of *The Water Regulations, 2002*. Late in the fiscal year, SE staff began to distribute this information by inclusion in a Drinking Water Information Binder that is being provided to each waterworks regulated by the department.

On April 5, 2002, Justice Robert Laing released the Report of the Commission of Inquiry into matters relating to the safety of the public drinking water in the City of North Battleford, Saskatchewan. The Report was the outcome of an Inquiry into events surrounding the contamination of the City of North Battleford by a protozoan parasite *Cryptosporidium parvum* that was discovered in late April 2001. The Commission produced a report, which documented significant details and offered a summary containing 61 findings and 28 recommendations. As of the end of the 2002/2003 fiscal year, all recommendations directed at the Government of Saskatchewan as represented predominantly by Saskatchewan Environment, Saskatchewan Health and Health Regions, were either implemented or in the process of being implemented.

1. Introduction

Safe drinking water is essential for human life and is an integral component in the protection of public health. High quality water is also important in maintaining the productivity of industry, sustaining commerce and is vital in ensuring crop production and ranching. The quality of drinking water, the condition of systems that produce it and protection of source waters are some of the most important environmental and public health issues in Saskatchewan at the present time. Ensuring safe drinking water is a shared responsibility. Drinking water and the systems which produce and protect it cannot be taken for granted.

This report seeks to inform residents of Saskatchewan of the status of drinking water quality and waterworks infrastructure in the province over the April 1, 2002 to March 31, 2003 period and will be provided on an annual basis in future years. The report outlines the roles, responsibilities and resources of departments and agencies involved in water management, the regulatory framework and the strategies adopted by the Government of Saskatchewan to manage water in the future. The report also discusses drinking water quality monitoring, operator certification, laboratory accreditation, source protection, information management systems and public education initiatives undertaken by government to protect human and environmental health. This report provides an update on progress in addressing the recommendations of the North Battleford Commission of Inquiry. Finally, the report outlines the performance and actions taken by departments and agencies in implementing the LTSDWS and attaining government's vision for a sustainable, reliable, safe and clean supply of drinking water that is valued by the citizens of Saskatchewan.

This report was built on contributions from Saskatchewan Environment (SE), Saskatchewan Health (SH), Saskatchewan Water Authority (SWA), SaskWater, Health Regions (HR), Saskatchewan Government Relations and Aboriginal Affairs (GRAA), Saskatchewan Agriculture, Food and Rural Revitalization (SAFRR) and the Municipal Financing Corporation. SE's Drinking Water Quality Section (DWQS) compiled the report.

1.1 Drinking Water Management in Saskatchewan – Rationale and Strategies

In the aftermath of events surrounding Walkerton, Ontario and North Battleford, Saskatchewan the Government of Saskatchewan and governments across Canada developed and implemented strategic approaches to water management while strengthening requirements and refocusing the roles of agencies that manage drinking water and related raw water sources.

1.1.1 Walkerton

In May 2000, Canada learned of a tragedy in Walkerton, Ontario, which resulted in approximately 2,000 cases of illness, caused 952 residents to seek medical attention and resulted in the death of seven persons. The outbreak was linked to a combination of contamination and inadequate disinfection of the Town of Walkerton's water supply. Ontario officials reported that sporadic inspections of waterworks conducted between 1995 and 1998 showed that the supply was not meeting the minimum requirements for microbial quality and chlorine residual. The people of Walkerton were periodically complaining about the chlorine taste and chlorine smell of the water when the concentration was high. The cause of the illnesses was predominately *Escherichia coli* (*E. coli*), specifically *E. coli* 0157-H7. The tragedy in Ontario attracted the attention of governments across Canada while media attention heightened the importance of vigilance with respect to all aspects of water treatment for municipalities and involved governing provincial jurisdictions across Canada.

Saskatchewan quickly reacted to the Walkerton incident by taking actions to enhance detection, resolve potential or real problems, prevent water contamination and improve communication with municipalities, between government departments and agencies, and with the public. SE developed a Bacteriological Follow-up Protocol for management of microbial related drinking water concerns. Since its introduction, this protocol has been pivotal in managing drinking water concerns. Other high priority changes made shortly after the Walkerton incident included improved sample analysis and notification, increased inspection of waterworks across the province, passage and implementation of a mandatory operator certification program, improved communication with communities and the public and other actions.

1.1.2 North Battleford

On April 25, 2001 SE issued the City of North Battleford a Precautionary Drinking Water Advisory (PDWA) because of suspected contamination of the drinking water supply. On April 26, 2001, the Medical Health Officer for the Battlefords Health District ordered residents of North Battleford, to boil their drinking water after the protozoan parasite *Cryptosporidium parvum* was detected in the community's drinking water system. Six to seven thousand people became ill after consuming water from the community, but no fatalities were attributed to the outbreak. The Emergency Boil Water Order (EBWO) was not lifted until July 25, 2001.

On May 7, 2001, Premier Lorne Calvert called an inquiry into the North Battleford incident as a means to determine the cause of the events, the effectiveness of officials in response, and the effect of relevant regulations, policies, procedures and practices. Justice Robert Laing started hearings on September 2001, with closing presentations heard in January 2002. Commissioner Laing's report, which included findings and recommendations, was released on April 5, 2002. Justice Laing concluded that a waterborne parasite, *Cryptosporidium*, had entered the drinking water system in North Battleford in March and April 2001 and was responsible for the resulting cases of illness. Commissioner Laing made 28 recommendations directed at SE, SH and the City of North Battleford. The recommendations focus on preventing further incidents from occurring in the future.

Inquiry recommendations range from specific changes to SE's treatment plant permits, increased plant inspections by the regulator, improvements to the cities water management policies and infrastructure, improved reporting and transparency, realistic water pricing in the community, improved response and capacity in the manner in which Health Districts and SH respond to communicable disease. This report was based on recommendations of the Commissioner of Inquiry, specifically recommendation 26(d) that *The Environmental Management and Protection Act (EMPA)* be amended to provide that the (drinking water quality) unit produce an annual report to the legislature on the state of drinking water quality in the province. The recommended legislative changes were made and this report was produced as a result of that recommendation. The complete summary of the Commission of Inquiry recommendations and the resulting actions and status their status as of the end of the 2002-2003 fiscal year appears at the end of this report.

1.1.3 Water Management Framework

In January 1999, the province released the Water Management Framework (WMF) outlining a vision for safe and reliable water supplies within healthy and diverse aquatic ecosystems. The WMF established goals for water management, objectives that provincial agencies must fulfill to realize water management goals and various actions. The framework recognized that current water management practices in Saskatchewan did not effectively integrate the interests of agencies resulting in a lack of coordination of activities, communication and the need for a more efficient decision-making process. The WMF called for actions to review and modify mandates and activities of provincial agencies involved in water management to increase service delivery efficiencies. The actions of the WMF have and are being incorporated into current and future water management directions and policies.

1.1.4 Long Term Safe Drinking Water Strategy (LTSDW)

On April 5, 2002, the Government of Saskatchewan released a LTSDWS in response to the Report on the Commission of Inquiry into public drinking water in North Battleford and as a planned component of other longer-term changes stemming from the Walkerton tragedy. The LTSDWS was developed during the fall 2001 to early winter 2002 with the vision of ensuring a sustainable, reliable safe and clean supply of drinking water that is valued by the citizens of Saskatchewan. The strategy was developed under the guidance of Executive Council with input from SE, SH, GRAA, SaskWater, Saskatchewan Finance and SAFRR.

As a means to attain the future vision for drinking water, as part of the LTSDWS, the Government of Saskatchewan adopted the following principles:

- **human health** is our primary concern;
- **preventing risks** to drinking water is a high priority;

- **openness and clear communication** will ensure everyone understands and carries out their responsibilities;
- **realistic pricing** acknowledges the value of safe drinking water;
- **accurate and timely information** about water problems and solutions is essential for waterworks owners, operators, regulators and users; and
- **all levels of government and citizens must work together** to develop and implement water management solutions.

The LTSDWS also established the following goals and objectives for future water management in Saskatchewan:

Waterworks systems and operations provide safe, clean and sustainable drinking water.
- Waterworks staff are capable and well-trained.
- Infrastructure produces water that meets the Canadian Drinking Water Quality Guidelines.
- Waterworks systems and operators are financially sustainable.

The drinking water regulatory system is clear and effective.
- Regulations are clear and ensure that health and drinking water quality will be protected.
- Capable and professional regulatory staff have access to the tools necessary to ensure compliance.

High quality source waters are protected now and into the future.
- Risks to source water quality are known.
- Watersheds are protected, natural purification and protection processes are maximized and potential for contamination is minimized.

Citizens and consumers trust and value their drinking water and the operations that produce it.
- Consumers value quality water and are willing to pay for it.
- Citizens and consumers trust the quality and reliability of their drinking water systems and are confident in the regulatory system.
- Citizens have meaningful access to information about the quality of their water.
- Reduced consumption of water.

The LTSDWS has become the focal point for future water management in Saskatchewan and has functioned as the strategic driver for changes made to legislation, regulations, departments, agencies and activities since its announcement in April of 2002. The discussion of revised roles, responsibilities, staffing, resources and legislation that follows, was based on the direction established by the LTSDWS.

The LTSDWS also established performance measures as a means to track and report change in water quality and the measures taken to improve and protect it. Where applicable, this report includes a report on drinking water quality and protection performance measures found in the strategy.

1.2 Agency Roles, Responsibilities, Staff, Resources and Legislation

1.2.1 Saskatchewan Environment

Through the reporting period, SE has carried a regulatory role for the management and protection of drinking water in the province. On October 1, 2002, *EMPA* was proclaimed and strengthened SE's regulatory role and broadened it responsibilities. During the first half of 2002-2003, prior to the proclamation of the new *EMPA*, SE was responsible for:

- development of SE's legislative, regulatory, structural and protocol changes to address the objectives of the LTSDWS and thereby improve water quality and management at works governed by the department;
- set standards, objectives and guidelines for drinking water quality, construction of water and wastewater works, surface water quality and use protection;
- issuing Minister's Orders requiring monitoring of drinking water quality. The regulatory responsibilities of the department applied to municipal waterworks, municipal wells and to non-municipal waterworks having a design flow rate over 18 cubic metres (i.e. larger industrial,

commercial and government waterworks). The Saskatchewan Water Corporation was responsible for issuance of approvals to construct and operate waterworks, with review and input from SE. SE also issued permits for municipal and industrial effluent discharges;

- establishing operator certification standards and liaison with the Operator Certification Board (OCB);
- monitoring of surface water and groundwater quality;
- management of drinking water and surface water quality monitoring data;
- inspection of waterworks and follow-up of detected drinking water quality problems using a bacteriological follow-up protocol developed during the summer of 2000 by SE, SH and HR;
- participate in development of aquifer management and protection plans, land use plans, environmental assessment, Intensive Livestock Operation (ILO) application reviews, land use planning and implementation; and
- participation in federal-provincial drinking water quality and wastewater quality committees and management initiatives.

On October 1, 2002, following the proclamation of *EMPA*, SE's regulatory role was strengthened. Changes and enhancements to SE's drinking water and wastewater management role include:

- an expanded legislative, regulatory and policy setting capability focused on drinking water and wastewater management;
- review and revision of standards, objectives and guidelines for drinking water quality, construction of water and wastewater works construction, and surface water quality and use protection;
- sole permitting authority for construction, alteration, expansion, operation and closure of waterworks, wastewater works and industrial effluent works. SE's authority for permitting applies to municipal waterworks, municipal wells connected to distribution systems, certain pipeline systems and to certain larger industrial, commercial and government waterworks;
- ongoing responsibility for establishment of operator certification standards and liaison with the OCB;
- a heightened waterworks inspection, compliance and enforcement role. SE also continues to work with SH and HR to manage microbial water quality issues through a revised Bacteriological Follow-up Protocol;
- an expanded role in the management of drinking water and surface water quality monitoring data including provision of greater public accessibility of water information through the internet;
- ongoing responsibility for monitoring of surface water quality;
- ongoing participation in development of aquifer management and protection plans, land use plans, environmental assessment, ILO application reviews, land use planning and implementation;
- ongoing participation in federal-provincial drinking water quality and wastewater quality committees and management initiatives; and
- an enhanced public education and communication role.

Effective October 1, 2002, SE has strengthened legislative requirements and responsibilities under *EMPA*. Some of these changes include:

- creation of a duty to provide safe water where that water is used for human consumption;
- providing SE with responsibility for permitting the construction and operation of municipal waterworks and wastewater works, municipal wells connected to distribution systems, certain pipeline system and certain large industrial, commercial and private waterworks;
- enabling the department to put in place a PDWA as an element of the law;
- the ability to issue Emergency Waterworks Orders and Emergency Sewage Works Orders to resolve issues which represent an immediate threat to human health and environmental quality;
- creation of administrative penalty provisions and other improvements for compliance and enforcement; and
- the ability to issue Waterworks Protection Orders and Sewage Works Protection orders including the ability to:
    - cease or suspend the operation of a works;

- suspend an operator from his/her duties relating to the operation of a waterworks or sewage works; and
- appoint a project manager to oversee the operation of the works.

On December 5, 2002, *The Water Pollution Control and Waterworks Regulations* in effect since 1984 were repealed and *The Water Regulations, 2002* were brought into force. These new regulations provide detail on the requirements for improved drinking water management in the future. Some of the features of these regulations, which are administered and enforced by SE, include:

- technical requirements for well construction and materials, water pipes, water reservoirs, water treatment facilities, pump houses and water treatment chemicals;
- mandatory drinking water disinfection including minimum disinfectant levels which must be achieved and maintained throughout a distribution system;
- mandatory standards for bacteriological drinking water quality, new standards for turbidity (a measure of water treatment efficacy) and health and toxicity related constituents. Bacteriological standards took effect December 5, 2002 for all new and existing waterworks. Standards for turbidity and other health and toxicity parameters are effective immediately for any new waterworks and are phased in over the next four to eight years for existing waterworks based on the size of the facility;
- immediate reporting of waterworks and wastewater works upsets which may impact drinking water quality or the environment. Instances of low disinfectant levels or failure of disinfection equipment must also be immediately reported to the department;
- a requirement for an independent assessment of human consumptive use waterworks conducted once every five years, with the first assessment to be completed by December 31, 2005;
- immediate mandatory compliance with a strengthened set of water testing and follow-up requirements;
- use of accredited laboratories for analysis of drinking water samples after March 31, 2004;
- requirements for water quality testing after alteration, extension or replacement of waterworks or components of a system;
- a broadened set of record keeping requirements including a statement of the manner in which records are to be maintained and who must perform this work;
- mandatory implementation of a water quality assurance/quality control policy by waterworks permittees by December 31, 2003 and the need for the permittee to review waterworks records and logs on a monthly basis, effective the same date;
- the need to provide an annual notice to consumers served by a waterworks with notification of the quality of water produced by the system and permittee's compliance with SE's sample submission requirements;
- ongoing operator certification requirements and the introduction of continuing operator education as a prerequisite for ongoing operator certification effective July 15, 2005; and
- the introduction of administrative penalties ranging from $1,000 to $5,000 for contraventions of certain provisions of the regulations and the Act.

Since April 2001, 15 new regional staff members were allocated to SE to aid in increasing the number of waterworks and wastewater works inspections across the province. Another 4.5 full time equivalent positions for drinking water quality management were provided to the Environmental Protection Branch (EPB) over the same time period. In April 2002, a dedicated Drinking Water Quality Section (DWQS) was organized within the EPB of SE. Resource allocations to SE for drinking water and wastewater activities during the 2002-2003 fiscal year totalled $2.484 million including the cost of 31.6 full time equivalent positions in the department. Another one-time funding of $450,000 was allocated to SE for the development of an improved drinking water data management system and $50,000 in one time funding was provided for public education and communication activities.

1.2.2 Saskatchewan Health (SH) and Health Regions (HR)

SH has the lead role in developing regulations and policy for public water systems that are not addressed by SE regulations. HR are responsible for administering the regulations and providing health related advice. Although not regulated by SH/HR, the HR when approached by an owner/user of a private

system will provide health related advice on water quality, water treatment and interpretation of water quality analysis.

SE's *EMPA*, 2002 contains provisions for a medical health officer of SH/ HR to act as an advisor to SE on water quality matters that may impact on the health of the public. *The Public Health Act, 1994* requires all municipalities (except northern villages and northern hamlets where potable water can be prescribed by regulation) to ensure that there is a supply of potable water for use by the residents of the community.

SH Provincial Laboratory (PL) provides most of the drinking water quality analyses, including bacteriological analyses, in Saskatchewan. Regulations and protocols require the PL to immediately notify the regulatory authorities of test results for samples taken from public water supplies that indicate the presence of total coliforms, *E. coli* or fecal coliforms.

HRs play an important role in Saskatchewan's drinking water by conducting disease surveillance, investigating water borne diseases and responding to outbreaks within their respective jurisdictions. SH and the PL also play an important role by conducting province-wide surveillance and providing advice to the HRs and SE.

Through the reporting period SH/HR has continued to work with SE and communities to ensure that public health issues relating to water quality are handled promptly and efficiently. On December 5, 2002 the new *Health Hazard Regulations* were brought into force. These regulations contain provisions to address public water supplies that are not regulated by SE (i.e. Rural Municipal Wells, tourist accommodations and small campgrounds) and do not apply to water supplies that (for the purposes of section 15 of *The Public Health Act, 1994)* are posted as being not potable.

The Health Hazard Regulations, which are administered by the HRs, include provisions that require the:

- HR to approve any public water supply that is established, extended, renovated or altered after December 5, 2002;
- owner and or operator of a public water supply to: ensure the water is potable at point of delivery; locate, construct and operate the supply to reduce the potential of contamination of the source and to prevent the contamination of water within the distribution system;
- treatment of water, when required by the HR, to ensure the water that is delivered for use is potable;
- submission of water samples, to an approved laboratory, for bacteriological and major ion analysis as well as any other analysis that the HR may require;
- immediate reporting to the HR of laboratory test results that indicate the presence of total coliforms, *E.coli* or fecal coliforms; and
- immediate reporting to the HR of any matter that may affect the safety of the public water supply.

As well, SH received an additional one time funding of $300,000 for a Laboratory Information Management System (LIMS) and annualized funding for an additional 7.5 full time equivalents and laboratory supplies to address the following:

- manage an 80 per cent increase in samples submitted for water quality testing. (Prior to Walkerton, 26,000 samples for bacteriological analysis were performed and increasing to 48,000 samples following the Walkerton outbreak);
- simultaneous testing for *E. coli* of all unacceptable bacteriological tests on water samples for samples taken from public water supplies;
- improved notification protocol for immediately advising Medical Health Officers (MHOs) following a positive *E. coli* test result on a water sample that was taken from a public drinking water supply;
- seek national accreditation for the water section of the PL by March 2004; and
- enable the PL to carry out additional tests on water samples from public water supplies regulated by SH's new *Health Hazard Regulations*.

1.2.3 Saskatchewan Watershed Authority (SWA)

The government of Saskatchewan has always pursued a multi-barrier approach to ensuring that Saskatchewan citizens have a safe and reliable drinking water. The first step in the multi-barrier approach is to keep the water as clean and pure as possible in the first place.

While untreated water from any source will always have naturally occurring contaminants, effective source water protection can help to prevent non-natural contamination. This begins with effective management of watersheds and aquifers.

Previously, watershed and aquifer management activities were divided among several agencies, the most important of which were SE, SaskWater and the Saskatchewan Wetland Conservation Corporation (SWCC). As part of the government's response to the North Battleford Commission of Inquiry, watershed and aquifer management responsibilities from these agencies have been consolidated into one new agency, the Saskatchewan Watershed Authority. SWA has a staff complement of approximately 190 full time equivalents.

SWA is created by and governed by *The Saskatchewan Watershed Authority Act* which gives it a mandate to:

- manage, administer, develop, control and protect water, watersheds and related land resources of Saskatchewan;
- promote economical and efficient use, distribution and conservation of water and watersheds of Saskatchewan;
- maintain and enhance the quality and availability of water, watersheds and related land resources of Saskatchewan for domestic, agricultural, industrial, recreational and other purposes;
- promote and co-ordinate the management, administration, development, conservation, protection and control of the water, watersheds and related land resources of Saskatchewan;
- maintain and enhance the quality and availability of water for various uses;
- promote and undertake research related to management and conservation of water and watersheds; and
- undertake and coordinate conservation programs.

SWA was created October 1, 2002 with a goal to provide sustainable water supplies and healthy watersheds. Key activities of SWA include watershed and aquifer planning; watershed monitoring; infrastructure management; regulation and licensing for water use; water dispute resolution and water education and information. It will also enter into public and private partnerships to deliver watershed stewardship and ecosystem protection.

SWA is responsible for five pieces of legislation: *The Saskatchewan Watershed Authority Act, The Water Power Act, The Conservation and Development Act, The Groundwater Conservation Act* and *The Watershed Associations Act.*

1.2.4 Saskatchewan Water Corporation (SaskWater)

The new SaskWater was established October 1, 2002 with proclamation of *The Saskatchewan Water Corporation Act, 2002*. Through this Act, SaskWater became a fully commercial Crown corporation providing water, wastewater and related services to municipal, industrial, government and domestic customers in the province. This Act also saw the transfer of all water resource management activities from SaskWater to the new SWA, and responsibility for irrigation (with the exception of the operation of irrigation infrastructure at four projects) move from SaskWater to Saskatchewan Agriculture Food and Rural Revitalization (SAFRR).

SaskWater is focussed on growing its service-oriented commercial activities. Its principle business lines are treated and untreated water supply to industry, irrigators and municipalities, regional water treatment system operations (i.e. the Wakaw-Humboldt and Codette Lake systems) and water quality management services (including project management, contract operations, audits and on-site training). SaskWater provides consulting, as well as contract operation and maintenance water services to municipalities.

SaskWater began offering Total Quality Water Management (TQWM) services in October 2002. These services are provided in direct response to customer interest and industry trends and provide clients with the option of contracting SaskWater to assume responsibility for the day-to-day operations of their systems. The customer chooses services as required, which may include SaskWater certified operation of the client-owned systems (water, distribution and wastewater), with production and delivery of treated water, water testing and analysis, all inspection and maintenance, management of the client's assets and 24/7 monitoring and emergency response.

SaskWater is headquartered in Moose Jaw and has offices in Watrous, Nipawin, Prince Albert, Saskatoon, Hanley, Wakaw and Melfort. SaskWater has approximately 70 full time, permanent employees.

1.2.5 Saskatchewan Government Relations and Aboriginal Affairs (GRAA)

GRAA is responsible for providing funding to municipal water systems in the province under the Canada-Saskatchewan Infrastructure Program (CSIP), the Northern Water and Sewer Program and the Northern Emergency Repair Program. The CSIP program funds all types of municipal infrastructure, but the first priority for funding under this program is water systems that need upgrades in order to provide safe drinking water.

The department responsible for *The Planning and Development Act, 1983* that allows municipalities to establish land use bylaws and development plans. As directed by the government's drinking water strategy, changes to the Act and *The Subdivision Regulations* will require all municipalities to have in place, by 2007, bylaws and watershed protection plans that protect drinking water sources.

GRAA is responsible for *The Rural Municipality Act, 1989, The Urban Municipality Act, 1984, The Northern Municipalities Act* and *The Qties Act*. As directed under the government's drinking water strategy, regulation making powers were provided in these acts in the 2002 legislative session that allows government to require municipalities to establish and publicly report on, pricing and capital investment policies for their water and sewer systems. Regulations will be established in 2003-2004 that requires municipalities to have these policies in place and report on them publicly by 2005.

1.2.6 Saskatchewan Agriculture, Food and Rural Revitalization (SAFRR)

The mandate of SAFRR is to foster a commercially viable, self-sufficient and sustainable agriculture and food sector and healthy and diverse rural communities. Working with individuals, businesses, communities and governments, SAFRR will assist farmers and ranchers to encourage higher value production and processing and promote sustainable economic and social development in rural Saskatchewan. The department's role in water management centres around the relationship between agricultural activities and water resources.

SAFRR provides for drinking water source supply protection through regulatory, research and technology transfer programs. The department:

- administers *The Intensive Livestock Provisions of the Agricultural Operations Act* which requires intensive livestock operations follow approved waste storage and waste management plans to ensure that water pollution will not result;
- administers Pesticide Applicator Licensing to ensure proper pesticide application which aids to ensure that water pollution will not result from use of pesticides;
- provides funding for applied research and demonstration in the areas of riparian management, grazing systems, forage production, permanent cover programs, soil conservation, livestock manure management and others which serve to protect water resources;
- delivers to farmers the latest production information with a focus on sustainable production practices; and
- delivers information related to developing and maintaining safe farm water supplies.

Legislation employed by SAFRR in activities associated with protection of source water and the environment includes *The Pest Control Products (Saskatchewan) Act*, *The AgriFood Innovation Act*, *The Provincial Lands Act* and *The Agricultural Operations Act*.

1.3 Other Organizations

1.3.1 National Organizations

The Government of Saskatchewan through line departments and agencies have participated on the following federal-provincial and inter-jurisdictional committees or task groups to strengthen water and wastewater management and standards.

- Canadian Council of Ministers of the Environment
  - Water Coordinating Committee
  - Water Quality Guidelines Task Group;
- Committee on Environmental and Occupational Health
  - Drinking Water Sub-committee; and
- Canadian Environmental Protection Act – National Advisory Committee
  - Municipal Wastewater Effluents working group.

1.3.2 Other Organizations

The following organizations contribute to the betterment of drinking water and source water management in Saskatchewan:

- Saskatchewan Association of Rural Municipalities;
- Saskatchewan Urban Municipalities Association;
- Saskatchewan Water and Wastewater Association;
- Saskatchewan Association of Rural Water Pipelines;
- Saskatchewan Public Works Association;
- Operator Certification Board;
- American Water and Wastewater Association – Saskatchewan Chapter;
- Association of Professional Engineers and Geoscientists of Saskatchewan;
- Consulting Engineers of Saskatchewan;
- Saskatchewan Environmental Society;
- Provincial Association of Resort Communities of Saskatchewan;
- New North;
- Western Canada Water and Wastewater Association;
- Western Canada Section - American Water and Wastewater Association;
- Saskatchewan Network of Watershed Stewards;
- Partners for the Saskatchewan River Basin;
- Saskatchewan Water Well Association;
- Saskatchewan Irrigation Projects Association;
- Canadian Water Resources Association;
- Nature Saskatchewan; and
- Duck Unlimited Canada.

2. An Overview of Saskatchewan's Drinking Water Supplies

2.1 Saskatchewan Environment Regulated Waterworks

SE regulates a number and variety of waterworks across the province. Under *The Water Pollution Control and Waterworks Regulations*, SE regulated potable water supplies at municipal waterworks, municipal wells and larger industrial, government and commercial waterworks across the province. SE regulated 593 waterworks in the province including 544 regulated water treatment works and an additional 49 municipal, private and government waterworks classified as distribution systems.

The promulgation of *The Water Regulations* on December 5, 2002 resulted in SE taking on additional responsibilities for pipelines connected to municipal waterworks or distribution systems and pipelines not connected to municipal waterworks or distribution systems with 15 or more service connections. The criteria by determination of which agency regulates industrial, government and larger commercial works

was also revised. Additionally, the new regulations also govern waterworks providing water intended or used for human consumptive use or hygienic use. As of March 31, 2003, SE had 601 permitted waterworks listed in its regulatory records. However with the implementation of new waterworks types and categories, it is expected that SE will regulate an additional 100 to 150 waterworks upon full implementation of *The Water Regulations, 2002*.

Based on department records as of March 31, 2003, SE regulated 601 waterworks which were comprised of the following systems:

- 543 municipal waterworks or municipal wells connected to a distribution system;
- 28 government waterworks systems;
- eight industrial waterworks; and
- 22 private waterworks.

As of March 31, 2003, all waterworks governed by *The Water Regulations* were categorized as Human Consumptive Use works. There was one waterworks with a portion of the system categorized as Hygienic Use due to the manner in which the system is constructed.

SE regulated waterworks obtain water derived from surface water sources, groundwater sources and groundwater sources under the influence of surface water. Table 2.1.1 provides a summary of waterworks source water type and population served (2001 Saskatchewan Health data) for SE regulated waterworks.

Table 2.1.1: Summary of Water Source/Population Served Statistics for SE Regulated Waterworks

Waterworks Water Source	Number of Waterworks	Population Served and Per Cent
Surface Water Source	151	599,609 (73.5%)
Groundwater Under the Influence of Surface Water	11	4,070 (0.5%)
Groundwater Source	427	183,407(22.5%)
Ground and Surface Water Source	12	28,805 (3.5%)

SE regulates both water treatment works and water distribution works. There are five categories of water treatment works and four categories of water distribution systems that vary with the complexity and size of the systems.

2.2 Saskatchewan Health/Health Region Regulated Waterworks

On December 5, 2002 *The Health Hazard Regulations* came into force. These regulations contain sections that address public water supplies that are not regulated by SE (i.e. rural municipal wells, small campgrounds, roadside cafes and tourist accommodations.) The exact number is currently unknown, however, it is estimated there are approximately 1,500 in Saskatchewan. Further work is underway to detail the list of waterworks regulated by SH and HR. The registry of regulated sites will be completed in 2004.

The number of semi-public facilities governed by *The Health Hazard Regulations* is a performance measure of the LTSDWS. The number of governed facilities is a good measure of the success of regulatory implementation and thereby the protection of semi-public water supplies. This is a new performance measure for the 2003-2004 fiscal year and will be provided in future reports.

2.3 Saskatchewan Watershed Authority (SWA) Regulated Water Sources

All allocations to use surface and ground water and all works to store and transport raw water, must be approved by SWA. Surface water allocations are issued as a Water Rights License under *The Water Rights Regulations*. Ground water use must be licensed under *The Ground Water Regulations*. All works and facilities including dams, ditches, aqueducts and other facilities for carrying and conducting water must be approved under *The Saskatchewan Watershed Authority Act* before construction.

Individuals requiring water for domestic purposes, that own land adjacent to the surface water source or will be accessing groundwater from their property, are exempt from the Water Rights and the approval to construct waterworks processes.

3. Licensed Works - Compliance: 2002/2003

The following provides information on drinking water quality key parameters for waterworks in Saskatchewan. Information, presented in part 3.1, regarding drinking water quality for SE regulated systems is based on ESQUADAT records compiled from monitoring information submitted by permitted waterworks.

3.1 Water Quality and Sample Submission Compliance – SE Licensed Waterworks

3.1.1 Microbiological

3.1.1.1 General Introduction

To protect the health and safety of Saskatchewan consumers, SE requires the owners and operators of water systems to regularly test for indicator bacteria in treated drinking water.

These indicator bacteria are total coliforms and fecal coliforms. During the total coliform test, the growth of background bacteria sometimes masks or suppresses the growth of coliforms. High levels of background bacteria should be absent in properly treated and safe drinking water. Therefore, background bacteria are also monitored and included in SE's follow up system for bacterial contamination. SE does not require routine monitoring for general bacterial populations in drinking water (i.e. heterotrophic bacteria).

Saskatchewan's bacteriological standards for bacteria in drinking water are:

Total Coliforms: 0 organism per 100 mL of sample.
Fecal Coliforms: 0 organism per 100 mL of sample.
Background Bacteria: Less than 200 organisms per 100 mL of sample.

Provincial bacteriological sample submission guidelines are shown in Table 3.1.1.1.1.

Table 3.1.1.1.1: Bacteriological Sampling Guidelines

Population	Groundwater Source	Surface Water And Blended Source
0 – 100	1 per 4 weeks	1 per 2 weeks
101 - 500	1 per 2 weeks	1 per week
501 - 5,000	1 per week	1 per week
5,001 - 100,000	1 per 2,000 population per 4 weeks	1 per 1,000 population per 4 weeks
Greater Than 100,000	1 per 4,000 population per 4 weeks	1 per 3,000 population per 4 weeks

3.1.1.2 Microbiological Sample Submission Performance

Based on SE's monitoring guidelines for bacteriological sampling, and the Permit To Operate Waterworks issued to the owner of each regulated waterworks, the total submission requirement for bacteriological samples is estimated at 22,035 samples per year.

The net compliance rate for submission of 21,995 valid samples was 99.8 per cent. Overall, a total of 22,404 regular bacteriological samples were received from licensed waterworks, giving an overall compliance rate of 101.6 per cent. A total of 409 of these were null samples and could not be counted because: 161were too old; 13 were involved in lab accidents; 174 contained interferences; 16 were broken in transit; 44 lab results questionable and one insufficient sample.

3.1.1.3 Excursions

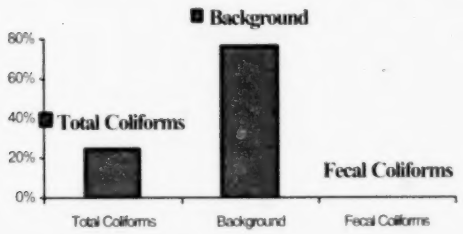
An excursion of the microbiological water quality standards occurs when a sample result exceeds a regulated value. A repeat sample is required to confirm the initial result when a regular sample is positive (contaminated). When a repeat sample is positive, a system owner is required to submit three special samples to assist in identifying the nature and extent of contamination.

In addition to regular municipal samples, 752 repeat bacteriological samples were received from 316 systems and 832 special bacteriological samples were submitted by 118 systems.

Regular Sample Excursions

A total of 778 of the 21,995 valid regular samples were positive (3.53 per cent). The distribution of positive samples between total coliform, background and fecal coliform positives is shown in Figure 3.1.1.3.2. Distribution of facility per cent positives is shown in Figure 3.1.1.3.1.

Figure: 3.1.1.3.2: Distribution of Bacteriological Positives Based on Regular Sample Submissions

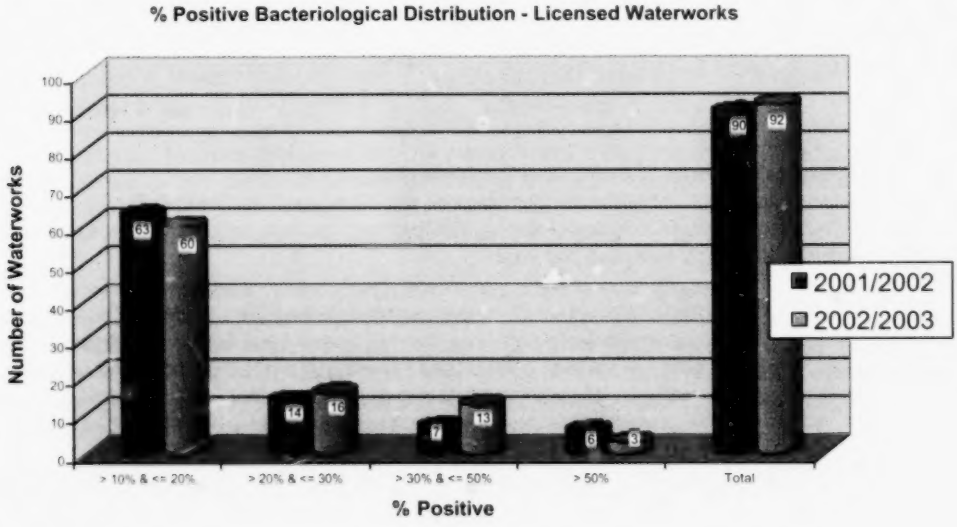


At some time during the year, 332 out of 601 regulated waterworks (55.2 percent) had samples that failed to meet provincial bacteriological objectives.

Three regulated waterworks had more than 50 per cent of their regular samples test positive. They were Laporte, Verwood and Wood Mountain. Another 23 regulated waterworks had between 25 per cent and 50 per cent of their samples test positive. They were: Beaubier, Candiac, Crystal Lake, Glenside, Hagen, Keeler, Kincaid, Meota, Mistatim, Osage, Palmer, Pathlow, Piapot, Plenty, Senlac, Smiley, St. Victor, Swan Plain, Viceroy, Weirdale, White Bear, Woodrow and Yellow Creek. A total of 92 regulated waterworks had greater than 10 per cent of their regular bacteriological samples test positive during the year.

Anytime positive bacteriological samples are reported, SE takes actions such as repeat sampling and the issuance of a PDWA to resolve concerns associated with the bacteriological quality of drinking water.

Figure 3.1.1.3.1: Facility Distribution of Bacteriological Positives Comparison



Repeat Bacteriological Samples
The 775 positive regular samples from 334 regulated waterworks should have resulted in the submission of 775 repeat samples. Only 752 repeat samples were received (97 percent); of these 109 were positive (14.5 per cent). Please note that 18 regulated waterworks failed to provide 26 repeat samples resulting from bacteriological positives during the 2002/03 fiscal year.

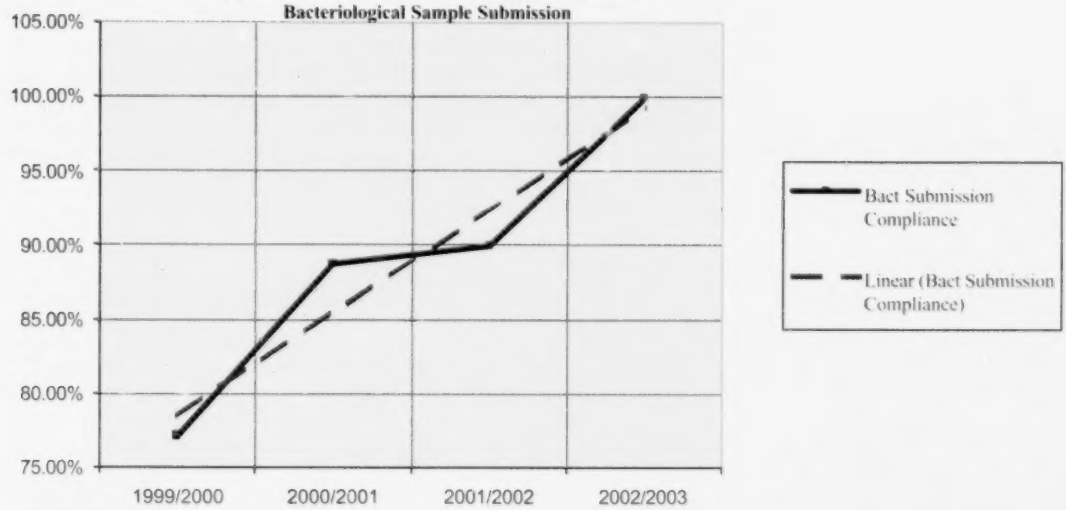
Special Bacteriological Samples
The 109 positive repeat samples should have resulted in the submission of at least 327 specials. There were 832 specials received (254 per cent) and 124 were positive (14.9 per cent).

3.1.1.4 LTSDWS Performance Measures
The LTSDWS established two performance measures to evaluate bacteriological performance for those works regulated by SE. Bacteriological Sample Submission (Figure 3.1.1.4.1) is a measure of the number of required samples for all permitted waterworks on an annual basis. This measure is intended to serve as gross measure of bacteriological sample submission compliance based on a combined requirement for all waterworks regulated by SE.

Trend information suggests there has been a significant and consistent improvement in bacteriological sample submission since 1999-2000. This improvement is likely based on heightened awareness of the importance of drinking water quality monitoring in the post-Walkerton and post-North Battleford time frames, increased use of control instruments such as Precautionary Drinking Water Advisories and Emergency Boil Water Orders and an increased inspection and vigilance by SE staff.

Although the net compliance for bacteriological sample submission for the 2002/2003 fiscal year was 99.8 per cent, it is expected this value may decline in the 2003/2004 fiscal year due to the addition of approximately 150 additional waterworks that are now captured by *The Water Regulations, 2002*. Furthermore, the operators of the waterworks control the quality of drinking water produced by waterworks on a day-to-day basis.

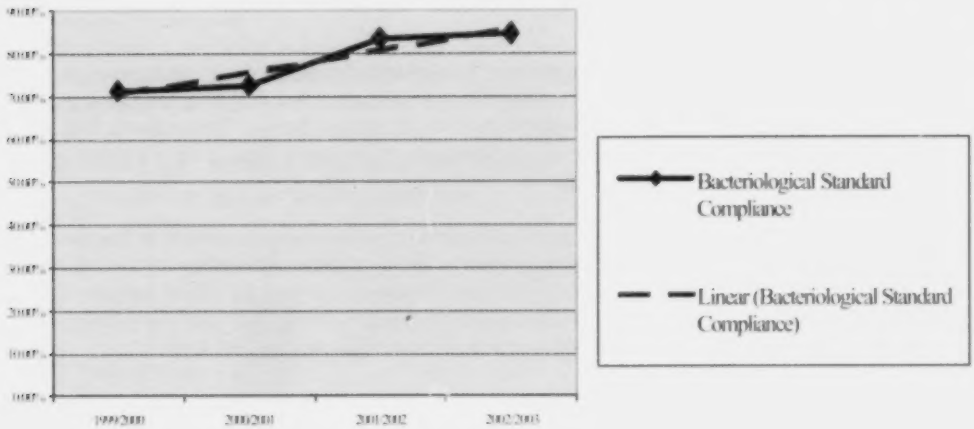
Figure 3.1.1.4.1: LTSDWS Performance Measures



Bacteriological Standard Compliance (Figure 3.1.1.4.2) is the second LTSDWS performance measure to assess the bacteriological quality of human consumptive use water produced by waterworks regulated by SE. This measure is a meaningful indicator of acute drinking water quality on more of a waterworks specific basis. Trend information suggests there has been a significant and consistent improvement in bacteriological standard compliance since 1999-2000. This improvement is likely based on heightened awareness of the importance of drinking water quality monitoring, increased use of control instruments

and on increased inspection and vigilance by SE staff. SE may influence waterworks operators in achieving a target of zero coliform organisms per 100 mL sample and less than 200 colonies per 100 mL sample for background bacteria levels through education, compliance and enforcement actions. The target is considered met if a waterworks achieves the target in at least 90 per cent of samples submitted for bacteriological analysis. Operators of the waterworks control the quality of drinking water produced by waterworks on a day-to-day basis.

Figure 3.1.1.4.2: LTSDWS Performance Measures
Bacteriological Standard Compliance



3.1.2 Turbidity

Turbidity is an indirect measure of particles in drinking water. These particles may harbour disease causing bacteria or protozoa, they may add to cloudiness or impart colour, they may result in the production of disinfection by-products or they may interfere with disinfection efficiency in water treatment.

Turbidity is an important indicator of water treatment process efficiency from both health related and aesthetic perspectives. As of December 5, 2002, compliance with turbidity standards is immediate for newly constructed waterworks. Existing waterworks producing water for human consumptive use will be required to meet the standards detailed in Table 3.1.2.2 by December 5, 2008 for systems serving a population of less than 5,000; and by December 5, 2006 for systems serving a population of 5,000 or more. Table 3.1.2.1 outlines revised monitoring guidelines for turbidity.

Table 3.1.2.1: Turbidity Monitoring Guidelines

Population	Groundwater Source	Surface Water and Blended Source
0 - 100	1 per day	1 per day
101 - 500	1 per day	1 per day
501 - 5,000	1 per day	1 per day
5,001 - 100,000	1 per day	Continuous
Greater than 100,000	Continuous	Continuous

During the 2002/2003 fiscal year, SE did not require municipalities to submit routine turbidity monitoring results. However, on-site monitoring for turbidity and record keeping is required for those regulated works captured by the criteria in Table 3.1.2.1. These records are checked during site inspections by SE's Environmental Project Officers (EPOs).

The Maximum Acceptable Concentration (MAC) in effect during the 2001/2002 fiscal year for turbidity in drinking water was 1.0 Nephelometric Turbidity Unit (NTU). See Table 3.1.2.2 for turbidity standards that became effective December 5, 2002.

The Aesthetic Objective (AO) for turbidity is 5.0 NTU. At this turbidity level, the cloudiness of a water sample becomes visually apparent. A turbidity of 5.0 NTU in the distribution system may be acceptable if the water system owner can demonstrate this higher turbidity does not interfere with disinfection of the drinking water. SE acknowledges that the turbidity MAC of 1.0 NTU may occasionally be exceeded in the distribution system and that minor, infrequent excursions do not necessarily compromise drinking water safety. However, unusual spikes or large changes in normal turbidity levels may indicate operational or source water problems that should be investigated.

Table 3.1.2.2: Turbidity Standards

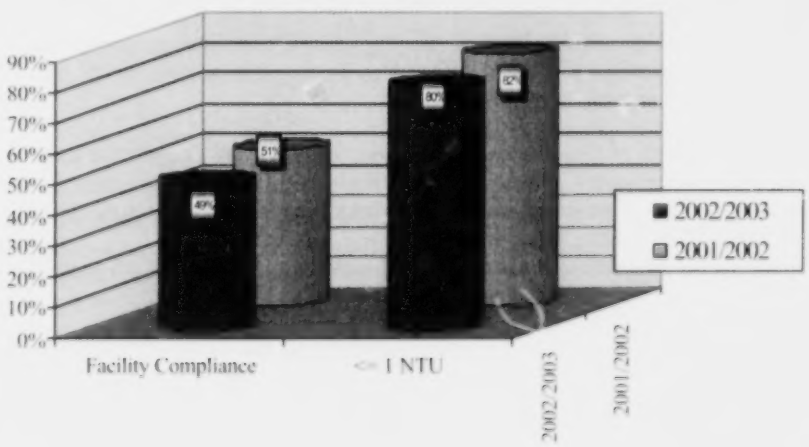
Source/Treatment	Routine Standard	Continuous Monitoring Time Duration Maximum.	Absolute Maximum
Surface water [1,2] source with monthly average source NTU 1.5 or greater employing chemically assisted direct filtration	Less than 0.3 NTU, 95% of discrete measurements or 95% of the time if continuous monitoring employed	Not to exceed 0.3 NTU for more than 12 consecutive hours if continuous monitoring employed	Never to exceed 1.0 NTU
Surface water [1,2]. Chemically Assisted Filtration – when monthly source water average is less than 1.5 NTU.	Less than 0.2 NTU, 95% of discrete measurements or 95% time if continuous monitoring employed.	Not to exceed 0.2 NTU for more than 12 consecutive hours if continuous monitoring employed	Never to exceed 1.0 NTU
Surface water [1,2]. Membrane Filtration	Less than 0.1 NTU, 95% of discrete measurements or 95% time if continuous monitoring employed.	No requirement.	Never to exceed 0.3 NTU
Surface water [1,2]. Slow Sand or Diatomaceous Earth Filtration	Less than 1.0 NTU, 95% of discrete measurements or 95% time if continuous monitoring employed.	Not to exceed 1.0 NTU for more than 12 consecutive hours if continuous monitoring employed.	Never to exceed 3.0 NTU
Groundwater [3]	Less than 1.0 NTU, 95% of discrete measurements or 95% time if continuous monitoring employed.	No Requirement.	No requirement.

[1] Includes surface waters and groundwater under the influence of surface water.
[2] Turbidity value measured from each filter effluent.
[3] Turbidity value for water entering the distribution system.
Other requirements apply for novel surface water treatment technologies.

Figure 3.1.2.1 shows a compliance comparison chart for turbidity sampling less than the MAC of one NTU and the percentage of required facilities testing and submitting samples for the 2002/2003 fiscal year versus the 2001/2002 fiscal year, based on testing by system owners.

Eighty per cent of the turbidity analysis results complied with the drinking water quality objective of

Figure 3.1.2.1: Turbidity Results <= 1 NTU & Facility Compliance



one NTU, which represents a 49 per cent facility compliance rate (facilities that submitted turbidity data with no values greater than one NTU) during the 2002/2003 fiscal year.

The data in Figure 3.1.2.1 consists of data reported by the system owners on their bacteriological sample submission forms. Groundwater, surface water and blended systems are included.

The range of turbidity results tested by all agencies in 2002/2003 (municipal, private and government owners) were:

Turbidity Range (NTUs)	Samples	Per Cent Samples	Systems
0 - 1	5,842	80.32 %	181
1 - 2	996	13.69 %	92
2 - 3	262	3.6 %	55
3 - 4	71	0.98 %	37
4 - 5	35	0.48 %	20
5+	67	0.921 %	30
Totals	7,273	100 %	206

Of the 206 facilities reporting turbidity monitoring data in 2002/2003, 181 facilities reported 5,842 of the 7,273 turbidity results to be less than the MAC, for a compliance rate of 80.32 per cent.

The range of turbidity results tested by all agencies in 2001/2002 (municipal, private and Government owners) were:

Turbidity Range (NTUs)	Samples	Per Cent Samples	System
0 - 1	4,977	82.3 %	153
1 - 2	694	11.5 %	76
2 - 3	194	3.2 %	40
3 - 4	67	1.1 %	22
4 - 5	48	0.8 %	17
5 +	66	1.1 %	16
Totals	6,046	100 %	170

Of the 170 facilities reporting turbidity monitoring data in 2001/2002, 153 facilities reported 4,977 of the 6,046 turbidity results to be less than the MAC, for a compliance rate of 82.3 per cent.

3.1.3 Chlorine Residuals

Regulated waterworks must provide multiple barriers to waterborne disease in their waterworks systems to ensure public health and safety. These barriers include protection of their raw water supplies (watersheds, reservoirs and well fields); employing treatment processes such as coagulation, sedimentation, filtration and disinfection; cleaning of storage and distribution systems; and prevention of cross connections in their distribution systems. Disinfection by chlorination is one of the key barriers to the spread of waterborne disease.

Section 30(5) of *The Water Regulations, 2002* requires regulated waterworks to continuously disinfect their drinking water. These regulations also stipulate the permittee of a regulated waterworks maintain:

(a) a free chlorine residual of not less than 0.1 milligrams per Llitre (mg/L) in the water entering a distribution system; and

(b) a total chlorine residual of not less than 0.5 mg/L or a free chlorine residual of not less than 0.1 mg/L in the water throughout the distribution system.

Application of Section 39(1)(a) of *The Water Regulations, 2002* through a permit to operate, requires the permittee of a waterworks to take daily chlorine residual tests to confirm if the required residuals are being achieved. SE does not require the owners and operators of licensed works to routinely submit

these test results, although SE checks them during site inspections. SE also conducts testing of free and total chlorine residuals at the treatment plants and within the distribution system during inspections. SE encourages waterworks operators to record chlorine residuals on bacteriological sample submission forms.

The requirements for minimum chlorine monitoring are:

- for free chlorine residual -- once per day from treated water at the water treatment plant as a condition of a Permit to Operate or Minister's Order; and
- for free and total chlorine residuals – the same frequency and locations used for bacteriological sampling.

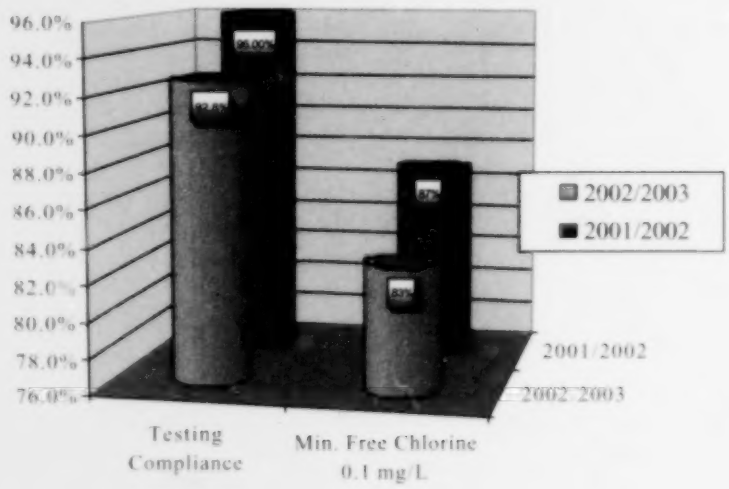
3.1.3.1 Free Chlorine Residual

A total of 558 regulated waterworks reported 21,590 analyses of free chlorine in 2002/2003. The statistical results were:

Mean:	0.535 mg/L
High:	11.2 mg/L
Low:	0.01 mg/L
Count:	21,590 samples

During 2002/2003, 558 out of 601 regulated waterworks reported free chlorine residuals (facility compliance rate of 92.8 per cent). A total of 21,995 free chlorine residuals from valid regular bacteriological samples and 752 residuals from repeat bacteriological samples and 832 special bacteriological samples were required for a total of 23,579 residuals. With 21,590 free chorine residuals submitted, the submission rate for free chlorine residual testing was 91.6 per cent. More than 83 per cent of the submitted sample results met the minimum requirement for free chlorine. These results are depicted in Figure 3.1.3.1.

Figure 3.1.3.1: Free Chlorine Facility Testing and Residual Compliance



A total of 522 regulated municipal waterworks reported 18,832 analyses of free chlorine in 2001/2002 as reported in the Drinking Water Compliance Report 2002. The 522 out of 544 municipalities reported free chlorine residuals (facility compliance rate of 96.0 per cent). A total of 22,035 residuals were required, therefore the submission rate for testing was 85.5 per cent. More than 87 per cent of the submitted sample results met the minimum requirement for free chlorine. These results are also depicted in Figure 3.1.3.1.

About 2,512 samples from 282 regulated waterworks analyzed for free chlorine in the 2002/2003 fiscal year contained concentrations less than the regulatory minimum of 0.1 mg/L. Therefore 46.9 per cent of the 601 regulated waterworks that reported free chlorine tests failed to meet the minimum chlorine residual regulation at some time during the fiscal year. This finding is lower than those reported in 2001/2002, however 36 more regulated facilities tested and reported free chlorine in 2002/2003.

3.1.3.2 Total Chlorine Residual

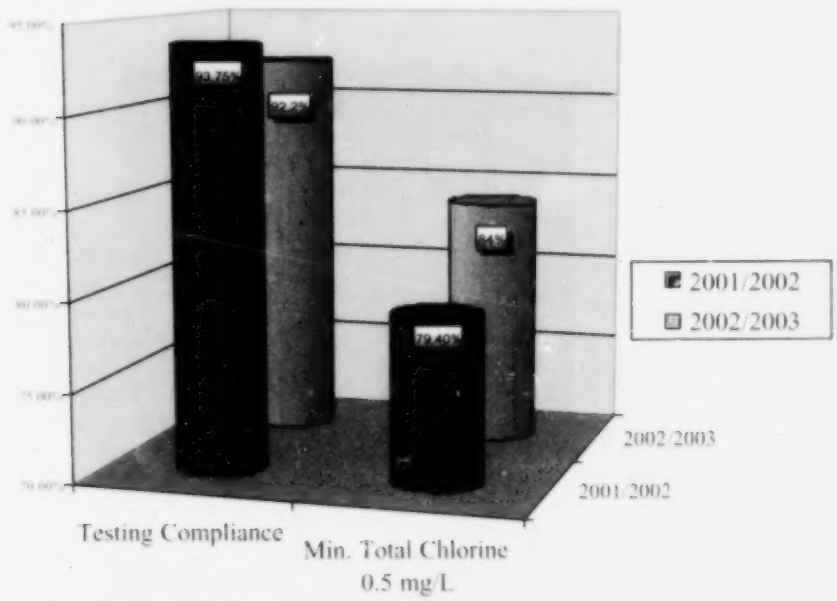
A total of 554 regulated waterworks reported 21,607 analyses of total chlorine during the 2002/2003 fiscal year. The statistical results were:

Mean:	1.08 mg/L
High:	12.9 mg/L
Low:	0.01 mg/L
Count:	21,607 samples

During 2002/2003, 554 out of 601 regulated waterworks reported total chlorine residuals (compliance rate of 92.2 per cent). A total of 21,995 total chlorine residuals from valid regular bacteriological samples and 752 residuals from repeat bacteriological samples and 832 special bacteriological samples were required for a total of 23,579 residuals. With 21,607 total chorine residuals submitted, the submission rate for total chlorine residual testing was 91.6 per cent. More than 84 per cent of the reported results met the minimum requirement for total chlorine. These results are depicted in Figure 3.1.3.2.

A total of 510 municipal waterworks reported 18,586 analyses of total chlorine during the 2001/2002 fiscal year. The 510 out of 544 municipalities reported total chlorine residuals (compliance rate of 93.75 per cent). A total of 22,035 residuals were required, therefore, the submission rate for testing was 84.3 per cent. More than 79.4 per cent of the reported results met the minimum requirement for total chlorine. These results are also depicted in Figure 3.1.3.2.

Figure 3.1.3.2: Total Chlorine Facility Testing and Residual Compliance

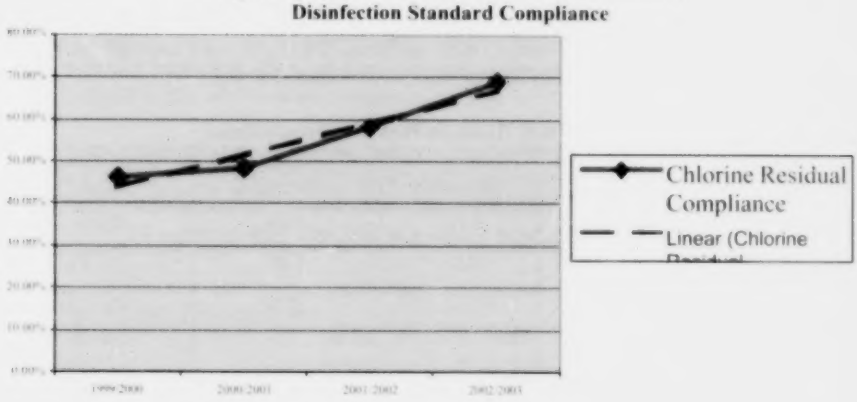


A total of 1013 of the 21,607 samples (4.69 per cent) analyzed by 219 regulated waterworks in 2002/2003 contained total chlorine concentrations less than the required minimum of 0.50 mg/L and a free chlorine concentration of less than the required minimum of 0.1 mg/L at some point during the fiscal year. The figure of 219 regulated waterworks in non-compliance with total chlorine or free chlorine residual requirements for distribution systems at some time during the 2002/2003 fiscal year, accounts for 39.53 per cent of the regulated waterworks that actually reported total and free chlorine tests during the fiscal year. Non-compliance is expected to be substantially higher in communities that did not report chlorine residuals.

3.1.3.3 Long Term Safe Drinking Water Strategy Performance Measures

During the 2002/2003 fiscal year, 68.7 per cent of regulated waterworks met SE's disinfection requirement 90 per cent of the time. Trend information suggests there has been a significant and consistent improvement in disinfection standard compliance since 1999-2000. This improvement is likely based on heightened awareness of the importance of drinking water disinfection, increased use of control instruments and on increased inspection and vigilance by SE staff. Although the compliance with disinfection requirements based on data from bacteriological sample submissions for the 2002/2003 fiscal year was 68.7 per cent, it is expected this value may decline in the 2003/2004 fiscal year due to the addition of approximately 150 additional waterworks that are now captured by *The Water Regulations, 2002*. Waterworks operators directly control chlorine residual on a day-to-day basis.

Figure 3.1.3.1.1: LTSDWS Performance Measures
Disinfection Standard Compliance



3.1.4 Trihalomethanes (THMs)

3.1.4.1 General Introduction

THMs are generated during the water treatment process as a by-product of free chlorine reactions. Significant levels may also occur when the raw water is obtained from a surface water supply. However, there may also be specific situations where groundwater may be of a quality to produce THMs. THMs exceeding 100 ug/L (micrograms per Litre) may pose a small (1 in 1,000,000) carcinogenic health risk to consumers who use the drinking water over prolonged periods (70 years). Regulated waterworks monitor THMs to assess health risks and to evaluate the effectiveness of their treatment processes.

For comparison to the THM objective, the winter, spring, summer and fall readings are averaged to calculate an average annual value. THM values illustrate seasonal variability and it is necessary to sample on a seasonal basis.

The maximum acceptable concentration of total THMs (the sum of chloroform, bromodichloromethane, chlorodibromomethane, bromoform) in drinking water is 100 micrograms per Litre (ug/L) based on an annual average of seasonal samples. The guideline requirements for THM monitoring are shown in Table 3.1.4.1.1.

Table 3.1.4.1.1: THM Monitoring Guidelines

Population	Groundwater Source	Surface Water and Blended Source
0 – 100	Nil	1 per 3 months during each spring, summer, fall and winter
101 – 500	Nil	1 per 3 months during each spring, summer, fall and winter
501 – 5000	Nil	1 per 3 months during each spring, summer, fall and winter
5001 - 100,000	Nil	2 per 3 months during each spring, summer, fall and winter
Greater than 100,000	Nil	2 per 3 months during each spring, summer, fall and winter

3.1.4.2 Sample Submission Performance

A total of 186 surface water treatment and delivery facilities were required to participate in the trihalomethane monitoring program during the 2002-2003 fiscal year, which should result in 808 samples being submitted each year. The actual number of regulated waterworks that submitted samples was 169 (90.9 per cent). A total of 633 samples (78.3 per cent overall compliance) were submitted by the facilities. The statistical results are tabulated in Table 3.1.4.2.1

Table 3.1.4.2.1: THM Sample Result Distribution

Average Annual THM (ug/L)	Number of Samples	Number of Submitters	THM Range (ug/L)	Number of Samples	Number of Submitters
All	633[†]	169	0-50	227	99
>50	406	139	51-100	166	87
>100	241	95	101-350	221	91
>350	20	13	351-500	18	12
>500	2	2	>500	2	2

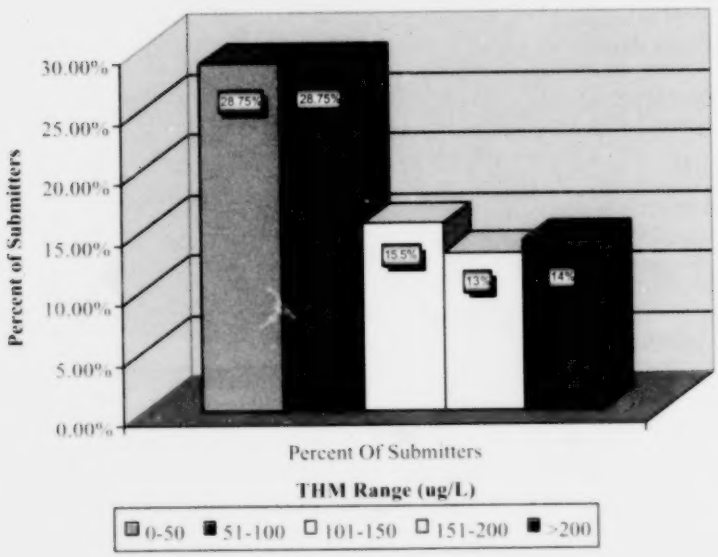
[†] 42 out of the 633 samples were not valid due to various issues such as sample interference, lab accidents, machine malfunctions and samples broken in transit.

3.1.4.3 Excursions

With respect to the annual average of seasonal results, the following is a summary of the number of municipalities that submitted and exceeded the maximum acceptable concentration for THMs:

- 44 regulated waterworks facilities averaged ≤100 ug/L and submitted less than 4 samples.
- 52 regulated waterworks facilities averaged ≤100 ug/L and submitted at least 4 samples.
- 40 regulated waterworks facilities averaged >100 ug/L and submitted less than 4 samples.
- 31 regulated waterworks facilities averaged >100 ug/L and submitted at least 4 samples.

Figure 3.1.4.3.1: Trihalomethane Ranges



The actual distribution based on seasonal samples annual averages is shown in Figure 3.1.4.3.1.

During 2002/2003, 95 regulated waterworks (51 per cent) submitted 241 samples for analysis that were over the maximum acceptable concentration for THMs.

During 2001/2002, 98 regulated waterworks (62 per cent) submitted 283 samples for analysis that were over the maximum acceptable concentration for THMs.

3.1.5 Health and Toxicity (H&T) Related Chemicals
3.1.5.1 General Introduction

H&T related chemicals are a grouping of parameters of health significance to drinking water consumers. These contaminants may be naturally occurring or they may be introduced into drinking water by human activities. Iron, manganese, copper and zinc are included in the general chemical classification. H&T related samples to be collected from the treated water at the water treatment plant.

This category comprises inorganic and organic chemical substances that pose a health hazard to individuals if present above certain concentrations in drinking water. For most parameters, the specified Maximum Acceptable Concentrations (MACs) have been derived by assessing the possibility of adverse effects after prolonged exposure. Table 3.1.5.1.1 summarizes the drinking water quality standards as mentioned by *The Water Regulations, 2002.*

Table 3.1.5.1.1: Canadian Drinking Water Quality Guidelines

Parameter	MAC mg/L	IMAC mg/L	AO mg/L
Arsenic	0.025		
Barium	1.0		
Benzene	0.005		
Benzo(a)pyrene	0.00001		
Boron		5.0	
Cadmium	0.005		
Carbon tetrachloride	0.005		
Chromium	0.05		
Cyanide	0.2		
Dichlorobenzene, 1, 2	0.2		0.003
Dichlorobenzene, 1, 4	0.005		0.001
Dichloroethane, 1, 2		0.005	
Dichloroethylene, 1,1	0.014		
Dichloromethane	0.05		
Dichlorophenol, 2, 4	0.9		0.0003
Fluoride [1]	1.5		
Lead	0.01		
Mercury	0.001		
Monochlorobenzene	0.08		0.03
Nitrates as NO_3	45.0		
Selenium	0.01		
Tetrachlorophenol, 2,3,4,6	0.1		0.001
Trichloroethylene	0.05		
Trichlorophenol, 2,4,6	0.005		0.002
Trihalomethanes (THM)[2]		0.1	
Uranium	0.02		
Vinyl Chloride	0.002		

MAC: Maximum Acceptable Concentration
IMAC: Interim Maximum Acceptable Concentration
AO: Aesthetic Objective
(1 - see Section 3.1.6 of this report)
(2 - see Section 3.1.4 of this report)

Monitoring guidelines for health/toxicity chemicals are shown in Table 3.1.5.1.2.

Table 3.1.5.1.2: Health/Toxicity Chemical Monitoring Guidelines

Population	Groundwater Source	Surface Water and Blended Source
0 – 100	1 per 2 years	1 per 2 years
101 – 500	1 per 2 years	1 per 2 years
501 – 5,000	1 per 2 years	1 per 2 years
5,001 - 25,000	Annually	Annually
>25,000	1 per 6 months	1 per 6 months

3.1.5.2 Sample Submission Performance

Sample submission requirements for H&T related chemicals were based over a two-year (April 1, 2001 to March 31, 2003) period to reflect the monitoring guidelines for some of the facilities that are requested to submit one sample every two years.

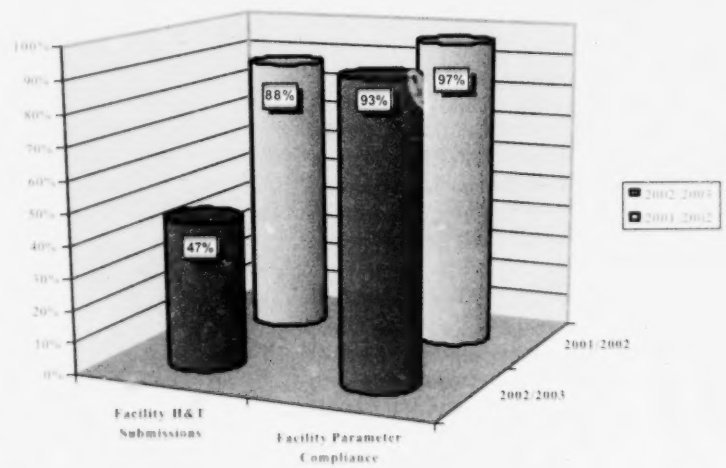
A total number of 569 regulated waterworks were required to sample, of which 266 facilities complied (46.7 per cent per cent compliance). A total of 595 samples were required, and 300 samples were submitted (50.4 per cent sample compliance).

3.1.5.3 Excursions

There were 18 facilities that exceeded at least one H&T related chemical objective. There were a total of 27 exceedences or excursions. The following is a list of the parameters and number of excursions at all the facilities:

Arsenic - 1
Boron - 1
Cadmium - 0
Chromium - 0
Copper - 0
Lead - 1
Nitrate - 9
Selenium - 3
Uranium -12

Figure 3.1.5.3.1: Health and Toxicity Facility Submission and Parameter Result Compliance



During the 2002/2003 fiscal year, 47 per cent of SE licensed waterworks submitted samples; 93 per cent of these waterworks met the drinking water quality objectives for H&T related chemicals. During the 2001/2002 fiscal year, 87 per cent of SE licensed waterworks submitted samples; 96.6 per cent of these waterworks met the drinking water quality objectives for H&T related chemicals. Figure 3.1.5.3.1 depicts these results.

3.1.6 Fluoride

3.1.6.1 General Introduction

Saskatchewan municipalities may decide to artificially add fluoride to their drinking water for the prevention of tooth decay. This decision is often put to the public in the form of a referendum or plebiscite.

Many raw water supplies contain some naturally occurring fluoride. Therefore, municipalities need to add differing amounts of fluoride to their drinking water to achieve the optimum range of 0.8 mg/L to 1.2 mg/L. The objective target is 1.0 mg/L. Saskatchewan's MAC for fluoride is 1.5 mg/L.

There are three fluoride chemicals used to add fluoride to drinking water. They are, in order of their estimated volume of usage in the province: hydrofluosilicic acid, sodium silicofluoride and sodium fluoride. If a system owner decides to fluoridate, technical help and advice are available from SE's regional offices to assist in process implementation and operation.

Systems that add fluoride are required to monitor their drinking water for fluoride on a regular basis, as shown in Table 3.1.6.1.1.

Table 3.1.6.1.1: Fluoridation Monitoring Guidelines

Population	Groundwater Source	Surface Water And Blended Source
0 - 100	1 per 4 weeks	1 per 4 weeks
101 - 500	1 per 4 weeks	1 per 4 weeks
501 - 5,000	1 per week	1 per week
5,001 - 100,000	1 per week	1 per week
Greater than 100,000	1 per week	1 per week

There are presently 58 licensed works that artificially fluoridate their drinking water or have naturally occurring fluoride in Saskatchewan as follows. Waterworks with naturally occurring fluoride are denoted with an asterisk: Annaheim, Assiniboia, Balgonie, Big River, Bruno, Canora, Carnduff, Dinsmore, Domremy, Estevan, Eston, Ferland*, Foam Lake, Frontier*, Goodsoil, Gull Lake, Hoey, Humboldt, Indian Head, Kamsack, Kerrobert*, Kindersley, Langenburg, Langham, La Loche*, Lake Lenore, La Ronge, Lashburn, Luseland, Marysburg, Meadow Lake, Melfort, Melville, Moose Jaw, Moosomin, Mortlach*, Muenster, Naicam, Outlook, Preeceville, Prince Albert, Rosetown, Rosthern, Rouleau, Rush Lake*, Saskatoon, SPC Coronach*, Star City, St. Isidore de Bellevue, Swift Current, Tisdale, Turtleford, Wadena, Wakaw, Watson, Weyburn, Whitewood and Wynyard.

There is a total Saskatchewan population of 370,466 (37.84 per cent of the total population of 978,933 based on 2001 census) receiving fluoridated drinking water.

3.1.6.2 Fluoride Excursions

Three communities have fluoride naturally present in their water supplies at concentrations exceeding the MAC of 1.5 mg/L in 2002/2003. The communities are Ferland, Frontier and Rush Lake.

SE monitors results from all systems that artificially fluoridate or that have high naturally occurring fluoride regularly. A total of 2,600 samples were submitted by 214 systems for fluoride analysis. Only 14 regulated waterworks had one or more results that exceeded the MAC of 1.5 mg/L. Of these 14 municipalities, three are known to have high natural fluoride and 10 artificially fluoridate their water. Communities with high natural fluoride have been notified, and Saskatchewan Health has been advised.

Fluoride concentration statistics from the municipalities were as follows:

Mean:	0.767 mg/L
High:	3.79 mg/L
Low:	0.03 mg/L
Count:	2,600 samples

Note: These data include routine submission data from fluoridating systems, as well as routine monitoring done by non-fluoridating systems with the General Chemical samples they submit in accordance with their Ministers Orders.

3.1.7 Water Quality Exceedence Summary

Appendix 1 provides a summary and identification of SE regulated waterworks with exceedence to any of the parameters within the parameter groups identified in sections: 3.1.1 – Microbiological; 3.1.3 - Chlorine Residuals; 3.1.4 – Trihalomethanes; 3.1.5 - Health and Toxicity; and 3.1.6 - Fluoride.

Section 3.1.2 regarding turbidity is not included in this summary as the data used in the turbidity section was derived from information noted on bacteriological sample submissions that are sampled from the distribution system. Turbidity standards are based on sampling results taken immediately following the filtration process in a water treatment facility. Distribution system data is not considered representative of treated water turbidity and is only used a possible indicator of turbidity concerns.

The criteria used to identity the regulated waterworks in Appendix 1 was as follows:

- microbiological – all regulated waterworks with more than 10 per cent of bacteriological sample results indicating the presence of bacteria (Bact % Positive) or bacteriological sample submission less than 90 per cent of permit requirements (Bact % Submitted);
- chlorine residuals – all regulated waterworks with less than 90 per cent of all reported free and total chlorine residual meeting regulated standards. (% Proper Chlorine);
- trihalomethanes – all regulated waterworks with annual average trihalomethane greater than 100 mg/L (THM Annual Average). The annual average value of seasonally submitted results is provided;
- health and toxicity – all regulated waterworks with at least one exceedence (reported value greater than parameter limit) to drinking water health and toxicity MAC for Arsenic, Boron, Lead, Nitrate, Selenium, Uranium and Benzo(a)pyrene (BAP). Exceedence values in excess of the MAC or Interim Maximum Acceptable Concentration (IMAC) are provided except for Nitrate[1], which is expressed as an average of reported values in excess of the MAC; and
- fluoride[2] – all regulated waterworks with at least one exceedence to the MAC for fluoride. Reported values in excess of the MAC are provided as an average of results in excess of the MAC.

All values in excess of the above criteria are in **bold text** in Appendix 1.

In summary:

- 154 regulated waterworks submitted less than 90 per cent of the required bacteriological samples required by permit;
- 90 regulated waterworks had more than 10 per cent of their regular bacteriological sample results exceed regulated standards;
- 187 regulated waterworks failed to maintain regulated chlorine residual standards at least 90 per cent of the time based on submitted bacteriological sample residual data;
- 73 regulated waterworks exceeded the IMAC for THMs with a value greater than 100 ug/L based on the annual average of seasonal results;
- one regulated waterworks exceed the MAC for arsenic with a value greater than 25.0 ug/L;
- one regulated waterworks exceed the IMAC for boron with a value greater than 5.0 mg/L;
- one regulated waterworks exceed the MAC for lead with a value greater than 0.01 mg/L;
- two regulated waterworks exceed the MAC for nitrate with a value greater than 45.0 mg/L;
- three regulated waterworks exceed the MAC for selenium with a value greater than 0.01 mg/L;
- 12 regulated waterworks exceed the MAC for uranium with a value greater than 20.0 ug/L;
- 1 regulated waterworks exceed the MAC for bnzo(a)pyrene (BAP) with a value greater than 0.01 ug/L; and
- 16 regulated waterworks exceeded the MAC for fluoride with a value greater than 1.5 mg/L.

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[1] Regulated waterworks with known Nitrate concerns are also analyzed for Nitrate concentrations during routine bacteriological sample analyses.

[2] Regulated waterworks with known Fluoride concerns or waterworks artificially fluoridating are also analyzed for Fluoride concentrations during routine bacteriological sample analyses.

3.2 Inspection and Regulatory Compliance – SE Licensed Waterworks

3.2.1 Inspection Elements, Frequency and Findings

SE has implemented a heightened inspection program on all waterworks facilities regulated by the department. The Drinking Water Quality Section (DWQS) is responsible for the policy development of the waterworks inspection program. The Inspection, Compliance and Enforcement Section in conjunction with SE's EcoRegions have developed an inspection program that ensures regular and rigorous compliance inspections are conducted at all waterworks facilities. The Section and regions created a Drinking Water Inspection Protocol and a Drinking Water and Wastewater Compliance and Enforcement and Protocol. These two protocols will provide a comprehensive inspection policy and apply a rigorous abatement-enforcement compliance policy on all SE regulated facilities. All information that is reported in part 3.2.1 is based on inspection records compiled by SE.

The program delivery or actual inspections are carried out by the EcoRegions, more specifically the Environmental Project Officers (EPOs) who conduct waterworks compliance inspections. To ensure that persons that are knowledgeable in water treatment best industry practices inspect facilities, the EPOs have as a minimum educational background a two-year diploma. In-house training consisted of a technical component (examination required), which would be the equivalent of Water Treatment Level 2 (WT2). Enforcement and Compliance training (examination required) and training on regulations and guidelines was also provided to all EPOs. As well, EPOs are required to acquire one Continuing Education Unit (CEU) every two years; exactly the same as the certification program which waterworks operators must acquire.

The inspection protocol called for at least one inspection at all SE regulated drinking water treatment plants during the 2002-2003 fiscal year. Long-term inspection frequency will require a minimum of one inspection per fiscal year on municipal waterworks which use groundwater (two inspections per year if the population is greater than 500 or if high risk is identified for a groundwater based supply), and two inspections per fiscal year on the municipal waterworks using surface water sources. All other waterworks facilities regulated by SE (including large private works, pipelines, industry, government and other waterworks) shall be inspected once each fiscal year. During a three year cycle,at least one inspection will be unannounced.

There were 788 inspections completed in this fiscal year; 787 inspections were required based on the number of waterworks and inspection frequency established by SE.

The Waterworks Compliance Inspection consists of a number of components as follows;

i) Pre-inspection element:

- a review of quarterly monitoring reports for water quality parameters and waterworks monitoring schedule to determine compliance and generate a data sheet for the operator;
- a review of correspondence regarding enforcement stages that have evolved - resulting from non-compliance activities;
- a review of recent engineering reports including date of last audit;
- a review of operator certification database;
- a review of equipment calibration log;
- consultation with Senior Health Inspector or public health inspector regarding any situations of concern, particularly where a PDWA or an EBWO has been issued; and
- consultation with SWA regarding source water protection and watershed concerns for the community in question.

The EPOs will calibrate their turbidimeter and chlorine test equipment on a monthly basis to ensure accuracy of their test results. In addition, once a year the calibration of this test equipment is to be verified by the instrument manufacturer.

The next component of the inspection involves an inspection of the source. Initially, the water source of all plants will need to be inspected and the following water source characteristics itemized and entered

into a central database. Following the initial inspection of the source and once any related issues of regulatory non-compliance have been resolved, the EPO determines the extent and frequency of water source inspection provided it meets the minimum of once every two years.

ii) Surface Water Source Background Characteristics:

- record approximate surface area, depth and condition (i.e. weed growth) of the source as well as the condition of physical protection (i.e. fencing, buffer zones, etc.) that may exist around the reservoir;
- record type and depth of intake;
- record lay of the land, potential runoff into the reservoir and buffer zone between reservoir and other activities in the immediate area that may cause a detrimental effect on water quality;
- record any chemical applications at the source (ensuring approved products and dosage rates);
- record condition of the intake pump house (both building and equipment);
- record any problems the operator may have had with the reservoir, cross referencing these with any watershed protection notes;
- record type of aeration equipment being used, location with respect to the intake and periods of use;
- record storage reservoir condition and the condition area surrounding the intake;
- record any other uses of the raw water; and
- record weather conditions that may dictate access to the source facilities in case of operational problems or failures.

iii) Groundwater Source Background Characteristics:

- record number of wells, complete with depth and diameter of each as well as when each are used;
- record depth to water (static level) and pump level;
- record condition of the well pump house and any equipment within;
- record adequacy of well protection including well cover, vents for potential surface runoff into well and drainage away from well;
- record whether depth measurements are properly recorded;
- record land use and soil type surrounding the pumps;
- record established well maintenance procedures; and
- determine if any connections to raw water lines exist.

The next component of the Waterworks Compliance Inspection involves the treatment plant which includes a review of the plant's processes and their operational effectiveness. A differentiation is made between what are mandatory inspection components and what are not (optional). The optional portion of the water treatment plant onsite inspection is left to the discretion of the individual EPO and his/her ability to identify problems that may affect the future safety of the water produced. Issues, problems or contravention of any aspect of the mandatory inspection component may direct the EPO to further investigate non-regulatory items.

iv) Water Treatment Plant Mandatory Inspection Components:

- minimum testing includes free/total chlorine at the water plant as well as turbidity tests on the raw water, from each individual filter, from the clearwell and out in the distribution system. Split samples are done with the operator to ensure the accuracy of the operator's test equipment;
- operator certification/training are reviewed and any certification program literature or documentation is provided as necessary to ensure the operator is aware of the certification requirements and components. The EPO records the operator's level of certification on each visit and advises the DWQS of changes for tracking purposes;
- record keeping components are reviewed and any record of an upset is examined and discussed;
- the general condition of the building and infrastructure is examined;
- existing quality assurance and quality control (QA/QC) measures are examined to ensure proper maintenance procedures are in place for things as: basins, storage reservoirs, filters, chemical feeders, pumps and electrical controls;

- discussion of a contingency plan or emergency response plan in the case of an incident should be conducted at this time;
- review record keeping and monthly internal record review procedures including examining the thoroughness with which problems are documented. Chlorine residual testing records are to be thoroughly reviewed since the last inspection. The review will consist of examining the daily operating sheets and counting and recording the number of days when the water treatment plant (WTP) was in non-compliance due to low chlorine residuals. Suspicious or repetitive data will be noted and chlorine dosage rate calculations should be conducted;
- the Permit to Operate and the associated waterworks monitoring schedule is provided and discussed once annually or when there are changes in the permit conditions. EPOs ensure conditions of compliance are understood, water quality exceedences are discussed, expiry dates are understood and also operators, management and administrators (where available) all understand the content and meaning of said permit once annually or whenever there are changes in the permit conditions. Any new regulations or information pamphlets are handed out at this time;
- inspection form is signed by the operator and copies given to the operator, manager, community administrator/waterworks owner and the Medical Health Officer (MHO). A signed copy is retained by the EPO;
- follow-up schedules are established by the EPO for problematic issues, water quality concerns or exceedences with the intent of bringing the facility into compliance; and
- EPOs record information such as fact sheets, brochures, compliance documents or compliance schedules that were provided, who the information was given to and how the information was recorded and any past correspondence that was reviewed. EPOs record who was present during the inspection and any associated discussions. This material is also kept on SE's file for the facility inspected. The DWQS is provided with a copy of the completed inspection form.

Table 3.2.1 summarizes the findings of key elements for inspections conducted during the 2002-2003 fiscal year.

Table 3.2.1: Specific Inspection Elements and Results

Inspection Element	Non-Compliant	N/A or No Response	Compliant
Disinfection Continuous at plant	21	32	735
Disinfection Free Chlorine > or = 0.1 leaving plant	91	52	645
Monitoring Daily Chlorine	149	22	617
Reservoirs in Good Repair	27	54	707
WTP in Clean and Orderly Condition	40	42	706

Water Treatment Plant Non Mandatory Inspection Components:

- the performance of each unit process in the plant can be analyzed by: observation, testing and questioning the operator about past operational upsets as well as reviewing relevant dosage calculations;
- additional water quality tests such as iron, manganese, sulphates, colour, etc. are performed to gain additional information on the operational efficiencies of each filter;
- determine whether the plant has the ability to filter to waste, length of time for the filter to waste cycle and the turbidity level at the end of the filter to waste cycle; ensure valves and pipes have been labelled and whether an operations manual has been developed;
- determine whether the plant has documented filter times, rates of backwash and types of media; determine what initiates a filter backwash cycle;
- determine the condition and functionality of chlorination/disinfection equipment and processes as it relates to drinking water treatment; and

- provide any new bulletins or fact sheets to operators that have been developed since the last inspection. Record that fact sheets and bulletins were discussed and with whom.

The final component is an inspection of the distribution system. A differentiation must be made between what are mandatory inspection components and what are not (optional). The optional portion of the distribution system inspection is left to the discretion of the individual EPO and his/her ability to identify problems which may effect the future safety of the water produced. Issues, problems or contravention of any aspect of the mandatory inspection component of the inspection may direct the EPO to further investigate non-regulatory items.

Distribution System Mandatory Inspection Components

- conduct minimum sampling that includes two locations in a distribution system serving a population of 100 or less or at four locations serving a population over 100. Samples are analyzed for free and total chlorine as well as turbidity. When chlorine residuals are not in compliance, a bacteriological sample is taken and submitted for analysis by the EPO;
- a review of QA/QC measures which exist for the distribution system is conducted annually. Procedures are examined including: flushing, swabbing, disinfection of main breaks, possible cross connections, water main pressure, leakage testing, etc. on an annual basis;
- ensure proper record keeping with regard to regulations related to free or total residuals in the distribution system is in place and review the rate/frequency of testing. Bacteriological sample submission rates and quality will have been examined before hand to give the EPO the number of submissions below regulations and understanding of the sampling frequency of the waterworks operator(s); and
- follow-up schedules are established by the EPO for problematic issues, water quality concerns or exceedences with the objective of bringing the distribution system or pipeline into compliance.

"Technical advice", defined as identifying process problems by testing and gathering information is to be offered to operators. However technical advice does not guarantee problems are rectified. In depth "Technical Assistance", in the sense of conducting corrective action or solving problems for the operator, will not be provided by the EPOs. It is recommended the owner contact a consultant or engineer to conduct a process evaluation.

3.2.2 Waterworks Not Meeting Minimum Treatment Requirements

Minimum Surface Water Treatment

To ensure that Saskatchewan residents receive safe and palatable drinking water, the province recommends certain minimum treatment processes be employed in each surface water treatment system. These processes include: coagulation-flocculation, sedimentation, filtration and disinfection. For surface water systems taste/odour control may optionally be employed. Systems with chemically assisted filtration and disinfection, or cartridge filtration and disinfection are also considered to be employing minimum treatment. All information presented in part 3.2.2 is based on SE inspection and waterworks records.

Based on a March 31, 2003 compilation of data, 21 systems did not meet the province's minimum guidelines for surface water treatment. They included: Antler, Broderick, Brooksby, Congress, Crooked River, Eldersley, Erwood, Fairy Glen, Goodsoil, Gronlid, Leader, Mistatim, Osage, Prairie River, Ridgedale, Riverhurst, St. Victor, Sunnyside Cottage Owners Association, Trossachs, Uranium City and Verwood. Benson, Parkbeg and Rama were removed from the list of communities identified in the previous report period. Verwood now continuously disinfects, however, the water supply has found to be a groundwater source under the influence of surface water therefore other treatment components are needed. Liberty now meets minimum treatment requirements, however, a PDWA remains in place because of high turbidity. PDWA's were in place for the periods that these systems failed to meet minimum treatment requirements.

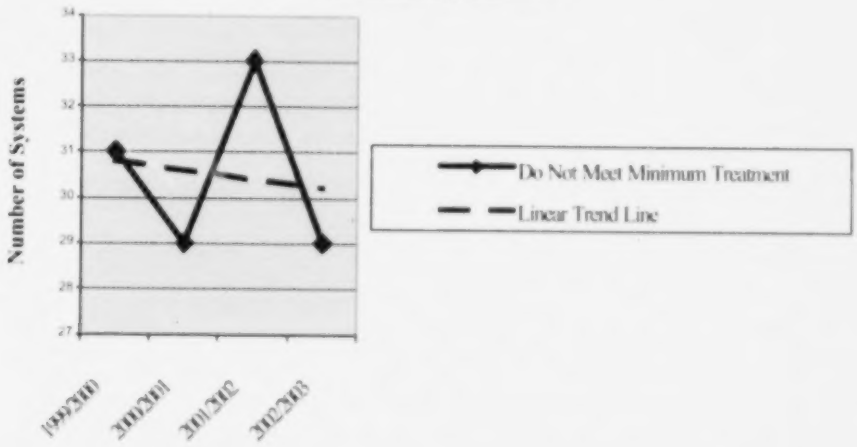
Minimum Groundwater Treatment

The minimum recommended treatment for groundwater in Saskatchewan is disinfection. Based on a March 31, 2003 compilation of data, eight systems did not meet the province's minimum guidelines for groundwater treatment; they included: Barrier Water Group, Beaubier, Candiac, Gladmar, Herschel, Readlyn, Shell Lake and Wood Mountain. The number of communities on this list decreased from the previous fiscal year. Pathlow, Penzance and Zelma were removed from the list as they now meet minimum treatment requirements. PDWA's were in place for the periods which these systems failed to meet minimum treatment requirements.

3.2.2.1 Long Term Safe Drinking Water Strategy Performance Measures – Minimum Treatment

The 2002/2003 fiscal year end list of facilities that did not meet minimum treatment requirements was reduced to 29. Figure 3.2.2.1 depicts recent results. SE staff meet with waterworks owners to aid them in understanding the need for upgrading works to meet minimum requirements. However beyond more rigid compliance and enforcement measure, owners of waterworks ultimately decide on the timing of waterworks improvements. Trend information suggests there has been a reduction in the number of waterworks that do not meet minimum treatment requirements since 1999-2000. Improvement is actually better than indicated by Figure 3.2.2.1 since additional waterworks not meeting minimum treatment requirements were found during the reporting period. This improvement is likely based on heightened awareness of the importance of drinking water treatment, significant support for infrastructure improvements through the Canada-Saskatchewan Infrastructure Program, increased use of control instruments such as PDWAs and EBWOs, and on increased inspection and vigilance by SE staff.

Figure 3.2.2.1: Drinking Water Systems that Do Not meet Minimum Treatment Requirements



3.2.3 Waterworks Related Infractions

SE has adopted a rigorous abatement-enforcement compliance policy for all SE regulated facilities. Based on guiding principles contained within the SE Enforcement and Compliance Framework document as well as the Drinking Water and Wastewater Enforcement Protocol, compliance with legislation is mandatory and all non-compliance issues will be addressed and appropriate actions will follow. Compliance will be obtained through the use of public education and prevention. Enforcement is a tool of last resort. All information presented in part 3.2.3 and 3.2.4 is based on SE inspection and compliance records as well as a summary PDWA and EBWO maintained y SE.

Some of the most common infractions during the fiscal year were record keeping errors, low chlorine residuals and inadequate sample submissions. Less serious infractions were noted on inspection forms and warnings were not given. In total, there were 1,676 infractions, predominantly minor problems, that resulted in a verbal warning (inspection form note for action) and in a very few cases some type of enforcement action. This value includes 70 PDWAs and EBWOs issued during the 2002-2003 fiscal year.

3.2.4 Enforcement Actions

Enforcement actions will be applied only when voluntary compliance cannot be achieved through the continued use of public education and prevention. They will also be applied when the non-compliance issue is causing, or may cause risk to public health and safety, or the environment, therefore warranting immediate enforcement action. Listed below are enforcement actions delivered by SE staff during the report period:

Administrative Compliance Options

The normal course of action is to use the following series of options prior to pursuing prosecution:

Warnings: Officers may issue Warnings if they have reasonable and probable grounds to believe that a violation of the law has occurred or is continuing. Officers may issue warnings when the harm or potential harm to the environment, human health or life is thought to be minimal. Warning may be given verbally, or in a written form via a Notice of Violation or a letter of non-compliance.

- **Verbal Warnings:** 1,600 verbal warning were issued during inspections and recorded on the inspection forms;
- **Written Warnings:** Notice of Violations and Letters of Non-Compliance include:
  - the section of the Act or regulation violated;
  - a description of the offence;
  - a time limit by which compliance with the warning must be completed; and
  - the statement that if the warning is not heeded, further action will be taken to ensure compliance;
- **Notice of Violation:** these were issued to two communities for operating their waterworks in contravention of *The Water Regulations, 2002*; and.
- **Letters of Non-Compliance:** issued to the elected officials of non-compliant communities in conjunction with a Notice of Violation, or may be issued without the Notice of Violation. Four communities were issued letters of non-compliance for contravention of *The Water Regulations, 2002*.

Failure to comply with the conditions of the Notice of Violation and/or the letter of non-compliance will result in further enforcement actions. Further enforcement actions include: cancellation of permits to operate, issuance of ministerial orders, assessing administrative penalties and prosecution.

3.3 Precautionary Drinking Water Advisories and Emergency Boil Water Orders

Precautionary Drinking Water Advisories (PDWAs)

PDWAs may be issued by SE when there is a concern that problems (due to microbial or chemical contamination) may exist. In a case of possible microbial contamination, the PDWA should be used to advise the public to boil the water. In a case of a chemical contamination, the public will not be advised to boil the water, but may be advised to look for alternative water sources of confirmed acceptable quality. PDWAs should be issued on evidence of:

- significant deterioration in source water quality (i.e. high turbidity due to runoff and other events);
- persistently low chlorine/disinfectant residuals (i.e. <0.5 mg/L of total chlorine residual or <0.1 mg/L of free chlorine residual);
- the bacteriological monitoring results show persistent total coliforms and overgrowths;
- lack of adequate treatment component(s) or equipment malfunctions in the treatment plant or disinfection system; or
- persistently high concentration of chemical parameters such as arsenic, boron, trihalomethanes, etc.

Emergency Boil Water Orders (EBWOs)

EBWOs are issued by HR officials to mitigate confirmed public health threats such as microbial contamination of drinking water. EBWOs should be issued on evidence of:

- confirmed presence of Fecal Coliforms combined with inadequate treatment;
- confirmed presence of *E. coli*.;

- confirmed verification of problems identified through the positive follow-up procedure questions and/or an inspection; or
- where epidemiological evidence indicates that the drinking water is responsible for an outbreak of illness (such as gastrointestinal illnesses).

EBWO's are issued by HR officials in consultation with SE staff. There are also specific protocols for the communication and removal of PDWAs and EBWOs. These protocols are documented in the "Bacteriological Follow-up Protocol for Waterworks Regulated by Saskatchewan Environment, EPB 205". Table 3.3.1 outlines temporal statistics for PDWAs and EBWOs issued during the 2002-2003 fiscal year.

Table 3.3.1: EBWO and PDWA Temporal Statistics for 2002/200

Time	EBWO	PDWA
In Effect Prior to Reporting Period	2	47
Added During the Reporting Period	17	46
Rescinded During the Reporting Period	12	38
In effect at End of Reporting Period	7	55

Table 3.3.2 provides information regarding the reasons for PDWAs issued during the 2002-2003 fiscal year. Further information on the nature of PDWA's and EBWO's during the 2002-2003 fiscal year is presented in Appendix 2.

Table 3.3.2: Reason for Issuing of PDWA's during 2002-2003

High Turbidity	10
Low Bacteriological Sample Submission	2
Inadequate Treatment	3
Late Spring Start-up (Parks)	9
Presence of *E.Coli*	8
High Total Coliforms	1
New Waterworks not proven safe	3
Positive Bacteriological Tests	6
Chlorinator Malfunction	2
Source Deterioration	2
Unsafe Water or Other	6

3.4 Saskatchewan Health and Health Regions Inspection of Public Water Supplies

The majority of the public water supplies that are regulated by *The Health Hazard Regulations* provide water to facilities that operate only during the summer months (i.e. campgrounds, tourist accommodations). Currently HR public health inspectors are just commencing to develop a registry of these types of systems and to inspect and assess each system and to ensure compliance with the regulations. In future annual reports SH will include more detailed information on these types of systems. In the interim period Health has protocols in place to quickly act to protect the public's health should a water test result for a sample taken from a public water supply that is regulated by Health indicate that the water is not safe.

4. Operator Certification Program

4.1 Background, Legislation and Mandate

Saskatchewan's Voluntary Operator Certification Program began in 1977 and an Operator Certification Board (OCB) oversaw it. The Board members were water and wastewater works operators who advised SE on operator certification and training issues. Under this program, participants were certified by criteria of formal education and facility work experience.

A review of the Operator Certification and the Training Programs in 1992 determined participation in the programs did not exceed 25 per cent of the provincial operators, leaving a large number of operators without any training and certification. Concerned over the low participation rate, SE surveyed all operators and municipal administrators on the future direction and an overwhelming response favoured a mandatory certification program administered by SE. A committee of stakeholders, including the Saskatchewan Institute of Applied Science and Technology (SIAST), the Saskatchewan Urban Municipalities Association (SUMA), the Saskatchewan Association of Rural Municipalities (SARM), the voluntary OCB, the Saskatchewan Water and Wastewater Association (SWWA) and SE moved forward, issued a final report in 1995 recommending SE institute a mandatory operator certification program. Subsequently, the department prepared changes to regulations to establish the new Mandatory Operator Certification Program effective of July 2000.

Amendments to the former *Water Pollution Control and Waterworks Regulations* stated, that by July 2005, each owner and operator of a waterworks or sewage works "licensed" by SE had to ensure the operation, maintenance and repair of those works was under the direction of an operator certified at facility classification level at all times. Further, strong recommendations were made to communities and owners of water/wastewater works that a similarly certified operator be available to take over in case the main operator was not available.

The former regulations also outlined the powers, duties and responsibilities of the OCB, and stated in the Operator Certification Standards 2000 the requirements of education, facility work experience and examinations that operators had to meet for certification. These requirements were based on established criteria generally recognized by regulatory agencies in North America. The former regulations also allowed operators, certified under the Voluntary Certification Program, to enter the new Mandatory Certification Program directly by writing certification examinations at their voluntary level of certification by January 14, 2002. Failure to meet this deadline meant that the operator would have to begin certification at the Class-1 level.

The Water Regulations, 2002 replaced *The Water Pollution Control and Waterworks Regulations* and strengthened the requirements for operator certification further. A new requirement of achieving 1.0 CEU (Continuing Education Units) for re-certification will have a major impact on certified operators. An operator will have to achieve 1.0 CEU of acceptable and certification-pertinent education prior to re-certification. There will be a choice of workshops, courses, correspondence courses, classes and so on offered by SIAST, SWWA, Saskatchewan Public Works Association (SPWA), or any other training agency in North America. These CEU cannot be accumulated and carried into another renewal period.

Another important change is that the OCB may now publish the name, level of certification, place of employment, certificate number and date of certificate issue/expiry for each certified operator. However, OCB is still bound by *The Freedom of Information and Protection of Privacy Act* that does not allow disclosing personal information, including the operator's education or work history.

A number of other regulatory changes were included that pertain to Board By-Laws in terms of its functioning in case of resignation or death of a Board Member, setting a maximum yearly certification fee, adoption of new certification standards, excluding hygienic use waterworks from mandatory certification and deleting any reference to the previous Voluntary Certification Program.

4.2 Compliance with Mandatory Operator Certification Program

On March 31, 2003, there were 403 Saskatchewan operators certified by examination listed on the SE database. Also there were 217 communities/facilities "licensed" by SE with at least one certified operator. Including a number of industrial facilities; 92 of these communities/facilities were in compliance with certification regulations by having an operator certified at the appropriate levels in all categories of the water and wastewater utility. Table 4.2.1 shows the numbers of operators certified at the various levels in the four categories of water treatment, water distribution, wastewater treatment and wastewater collection. Operators in smaller communities (generally below population of 1,500) are often certified in any or all of the four categories, whereas in larger communities operators tend to specialize in one or two categories.

The OCB issues two-year renewable certificates to Saskatchewan operators who meet criteria listed in the Operator Certification Standards 2002. Thus, the vast majority of certified operators work at facilities that are within SE's jurisdiction. However, there are a number of certified operators who work in facilities that are not within SE jurisdiction, and they are not listed in the statistics in this report. This includes two operators with the Department of National Defence, one operator working at a national historic site, two operators working in Prince Albert National Park and four operators working at First Nations facilities. There are also 14 operators with valid certificates who are out of province or presently not working; their certificates will remain valid unless they are cancelled or are not renewed. The OCB reported in their Annual Report to SE that 426 operators were certified as on March 31, 2003.

Table 4.2.1: Distribution of Certified Operators Water and Wastewater Works Fiscal Year 2002-2003 (SE Data)

System Classification	Water Treatment	Water Distribution	Wastewater Treatment	Wastewater Collection
Small System[1]	54[2]	56	16	16
Class-1	118	152	107	99
Class-2	91	86	25	48
Class-3	35	6	14	3
Class-4	9	0	9	1
Total	307	300	171	167

[1] There are two types of Small Systems. A Small Water System is defined as a Class-1 groundwater treatment and/or Class-1 distribution system, serving fewer than 500 people. A Small Wastewater System is a Class-1 wastewater treatment system (generally a lagoon system) and/or a Class-1 collection system serving fewer than 500 people.

[2] Of the Small Water System operators, there are 17 that each operate a number of Small Water Systems within the provincial parks.

Since the mandatory program has been in effect, the number of certified operators and communities in full compliance has increased steadily. Table 4.2.2 shows how certification has progressed since then.

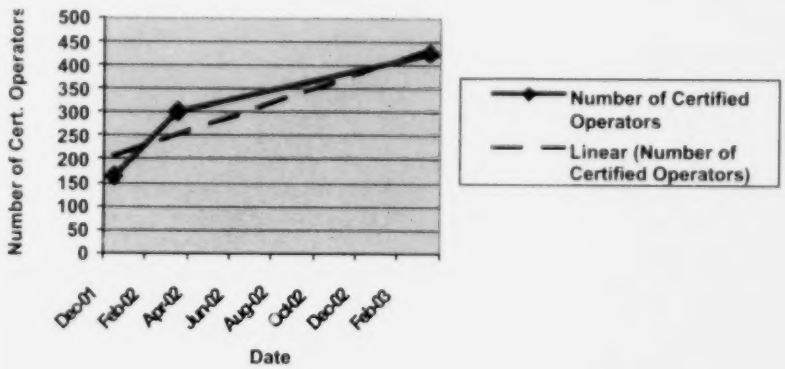
Table 4.2.2 Certification Summary Water and Wastewater Works (SE Data)

	2000/2001	2001/2002	2002/2003
Certified Operators	44	293	403
Communities with Certified Operators	24	116	217
Communities in Full Compliance	1	35	92
Per Cent Compliance	0.2%	5.7%	15%
Number of licensed works	609	609	617

*Licensed works includes water treatment works, water distribution systems, wastewater treatment works and wastewater collection systems.

The number of certified operators is a performance measure for the LTSDWS. The number of certified operators is a measure of the success of regulatory implementation and a measure of the safety of water produced, since operator knowledge will influence the quality of water produced. As of March 31, 2003, the OCB reported that there were 426 classified certified operators. It is a regulatory requirement that by July 15, 2005 each waterworks be under the

Figure 4.2.1 Summary of Certified Operator Trends



direction of an operator certified who holds the corresponding certificate for the classification of the works. However, operators and owners must take action to ensure this target is met. Trends portrayed in Figure 4.2.1 indicate there has been a significant increase in the number of certified water and wastewater operators since the commencement of the mandatory certification requirement. This improvement is likely based on heightened awareness of the importance of operator certification in the post-Walkerton and post-North Battleford time frames, increased use of control instruments such as PDWA and EBWO, and on increased inspection and vigilance by SE staff. SE staff regularly remind operators of mandatory certification requirements during each inspection of a waterworks.

4.2.1 Certification for Operators of First Nations Facilities

Water and wastewater operators of First Nations Facilities are not under the jurisdiction of SE. Historically, many First Nations operators had participated in the department's operator training program and were also members of the SWWA, even though they had their own First Nations Water Operator Association. A number of First Nations operators were also certified under SE's voluntary certification program.

When the Mandatory Certification Program was introduced, First Nations operators were invited to participate if they wished to follow the certification criteria listed in regulations.

In the fall of 2002, Indian and Northern Affairs Canada's issued a call for operators at all First Nation facilities in Saskatchewan to undertake training and to become certified. Five Tribal Councils made arrangements with a number of training agencies to provide this training and made further arrangements for Saskatchewan's certification examinations to be made available to them. The Tribal Councils plan to have their operators certified in Saskatchewan's Mandatory Operator Certification Program.

4.3 Operator Certification Board (OCB)

The Water Regulations 2002 establish the OCB and its powers, duties and responsibilities. The Minister of Saskatchewan Environment appoints Board Members annually for a one-year renewable term. They represent owners of water/wastewater works, operators of these works and post-secondary education (in the field of water/wastewater technology/engineering). Present Board Members and their affiliations are:

Chair:	Glenn Greve, Shaunavon; representing operators
Vice-Chair:	Al Loke, La Ronge; representing owners of northern water/wastewater works
Member:	Ed Sigmeth, Pilot Butte; representing owners of water/wastewater works
Member:	Tom Olson, SIAST, Moose Jaw; representing post-secondary education (in the field of water/wastewater technology/engineering)

The Board established its own office with an Office Administrator, filing system, financial management system, operator record keeping system, Board By-Laws and system for communicating with its own members, with operators and with various government agencies to conduct its business. The regulations outline the responsibilities of the Board in terms of issuing/not issuing, renewing and revoking an operator's certificate. As well, the regulations, through the adoption of the *Operator Certification Standards 2002*, update the criteria that an operator must meet to become certified. The Board's mandate is to interpret and to follow these Standards when making decisions on an operator's application for certification. SE sits on the Board in an advisory capacity.

The Board is expected to become a self-funding entity, based on certification and renewal fees after the certification program is fully in force in July 2005. The present certification and renewal fees of $130/two year certificate were established during the program's formative discussion and were based on 750 operators representing full certification for all the waterworks, distribution systems, wastewater works and collection systems. These discussions did not anticipate any new waterworks, regional pipelines or pipeline associations that have emerged within the last several years. In the interim, any shortfall in funding is met by grants from SE.

4.4 Education and Training

Currently SWWA offers workshops during the training season and a number of short workshops at the associations annual conference.

In 1997 and 1998, SIAST developed its certification preparatory program culminating in the Water/Wastewater Technician Program (a series of correspondence courses, including Class-1 and Class-2 water/wastewater level process courses) and the Small Seasonal Drinking Water Systems (a correspondence course). Concurrently it began to develop a workshop series, based on SE's operator training program, supplemented by its own workshop series. SIAST constructed a teaching facility specializing in hands-on work stations and laboratory facilities to facilitate the teaching of operational and water/wastewater quality testing skills for operators. SE is a member of SIAST's Water/Wastewater Technician Advisory Committee and has advisory input to SWWA through membership on its executive.

In 2001, SIAST began to offer five-day classroom sessions at several SIAST campuses, with the option of writing a Small System certification examination after three days of training or writing Class-1 certification examinations at the end of five days. SIAST also offers a Class-2 level water treatment/distribution 3-day course. In 2002, a number of Regional Community Colleges began to offer SIAST's Class-1 classes under contract using local instructors.

During the 2002/2003 fiscal year, SIAST offered four Small Water Treatment and Distribution Systems and Level 1 Water Treatment and Distribution classes and four Small Wastewater Treatment and Collection Systems and Level 1 Wastewater Treatment and Collection classes each with examinations, as well as one Level 2 Water Treatment and Distribution classroom session. As well, SIAST also offered seven training workshops and its Water/Wastewater Technician and Small Seasonal Drinking Water Systems correspondence courses.

The Saskatchewan Public Works Association also offers an annual conference and trade show aimed at public works personnel, which includes distribution and collection system staff.

Two private consultants have been offering classroom sessions at various locations to help operators prepare for certification examinations. The first consultant offers frequent five-day classes dealing with water treatment and distribution and wastewater treatment & collection each followed by pertinent Class-1 certification examinations. During this fiscal year, this consultant offered 38 five-day classroom sessions with examinations in Saskatchewan, of which the last 17 were offered strictly to First Nations operators of four Tribal Councils.

The second consultant occasionally offers two-day weekend sessions on either Class-1 water treatment and distribution or wastewater treatment and collection, without certification examinations. Both contractors occasionally offer Class-2 level sessions.

One Tribal Council contracted the Northern Alberta Institute of Technology to provide four classroom-training sessions, and contracted the SWWA to provide Saskatchewan certification examinations.

4.5 Certification Examinations

SE, as the regulatory agency, ensures availability of the certification examinations and maintains records of test scores obtained by operators. The examinations are obtained on an annual basis from the Association of Boards of Certification of which SE is a member.

SWWA administers all certification examination sessions on behalf of the department, in cooperation with SIAST, the Regional Community Colleges, private trainers and others. SWWA handles examination bookings, registrations and billing; ensures SIAST and the Regional Community Colleges provide an examination supervisor for all exam sessions; and arranges with SE that examinations be provided at each location.

During the 2002/2003 fiscal year, SWWA administered 73 examination sessions in the province. There were 60 certification examination sessions held in conjunction with classroom sessions by SIAST,

community colleges and a private consultant. In addition, SWWA organizes certification examination sessions that are not related to any training sessions. These sessions are offered at various locations in the province, allowing operators to prepare on their own to challenge examinations when they are ready to write or to rewrite examinations. During the 2002/2003 fiscal year, SWWA organized 13 such examination sessions.

4.6 Communities with Certified Operators in Place

A detailed listing of communities or systems with certified operators in place, the classification of the waterworks and sewage works systems and the level of certification achieved is provided in Appendix 3.

5. Infrastructure - Status and Support

5.1 Waterworks Safety Assessment Protocol

Over the last fiscal year, SE developed a protocol to determine the relative safety of Saskatchewan's waterworks. The protocol was based on a risk-based model that allows the department to be proactive and is designed to help focus efforts where needed. Using such a tool is valuable in identifying those waterworks that need attention. The overall purpose of the relative safety rating protocol is to produce a system to compare the safety of waterworks systems across the province and was developed in response to the North Battleford Commission of Inquiry.

The relative safety rating system is based on a multi-barrier approach to evaluate a complete waterworks from source to tap. In doing so, not only the physical barriers to contamination were identified but also programs and plans, such as a quality control and quality assurance plan, that when implemented are barriers that prevent contamination from reaching the consumer. A waterworks receives a weighted number of points for selected barriers to contamination if that barrier is effective and optimized. The relative rating system for safety of waterworks is a simple tool that can be used to compare all waterworks in the province.

The relative safety rating can be used to:

- compare and rank all water systems in the province;
- track the improvement in a water treatment system over time; and
- track the increasing safety of waterworks across Saskatchewan.

The relative safety rating cannot be used to:

- determine a safety number above which drinking water is safe and below which drinking water is not safe;
- compare groundwater and surface water sources against each other;
- give an average safety value for the province to be used to determine whether drinking water in the province is safe or unsafe; and
- determine the number of 'poor' water treatment systems or 'adequate' water treatment systems in the province.

The ratings that result from the procedure are only valid for comparison. There is no basis to determine how large a rating must be in order for the water to be considered safe. The numbers are only valid when used in context with other safety numbers from this procedure. Up to March 31, 2003, 36 regulated waterworks have been evaluated. These results have been used to assist in allocating funds from the CSIP program to those waterworks that need it most. Table 5.5.1 provides a summary of the range of scores for a range of typical waterworks which may be produced using SE's waterworks safety assessment protocol.

Table 5.1.1: Summary of Typical Relative Safety Analysis

Location	Source	Treatment	Distribution	Operation and Mainetenance	Total Points	Normalized
Blended-Excellent	855	4770	1350	1500	8475.0	1.000
Maximum Groundwater	2400	3170	1350	1500	8420.0	0.994
Maximum Surface Water	120	4770	1350	1500	7740.0	0.913
Conventional Surface Water Treatment with Ultraviolet	120	3270	1350	1500	6240.0	0.736
Groundwater with Chlorination	2400	330	1350	1500	5580.0	0.658

5.2 CSIP Projects and Funding

5.2.1 The Canada-Saskatchewan Infrastructure Program

The CSIP is a five-year federal-provincial program that was put in place in 2001 to provide infrastructure funding to municipalities. Funding water and sewer projects is a priority under this program. Information provided in part 5.2 is based on records maintained by Saskatchewan Government Relations and Aboriginal Affairs (GRAA).

In 2002/2003, 74 water supply projects and 28 sewer projects were approved in southern municipalities. Another 12 water and sewer projects were approved in northern communities. The total provincial and federal funding committed for these projects was $22.3 million. All communities with drinking water advisories or boil water orders due to infrastructure problems that applied for funding and met the application deadlines were approved for CSIP funding.

GRAA, the Federal government (Western Economic Diversification – WED), the Saskatchewan Association of Rural Municipalities and the Saskatchewan Association of Urban Municipalities agreed that beginning in 2004 municipalities will provide with their CSIP applications a long term financial plan for their utilities. Also in 2004, for water projects funded under CSIP, municipalities will be required to commit to meeting the provincial water quality standards and retain the services of a certified water systems operator. A summary of projects approved for funding for the 2002/2003 fiscal year under CSIP appears as Appendix 4.

5.2.2 Northern Water and Sewer Program and Emergency Repair Program

The Northern Water and Sewer Program is a four-year, $24.9 million provincial program that was established in 2000 to upgrade water and sewer systems in 35 communities in northern Saskatchewan. Funding to the program comes from the CSIP, the Centenary Fund, the Northern Revenue Sharing Trust Account, Indian and Northern Affairs Canada and municipalities.

In 2002/2003, $6.3 million was spent on developing and upgrading water and sewer systems in 27 communities in the north. Also in 2002/2003, $199,000 was spent on 12 water and sewer projects under the Emergency Repair Program.

A summary of projects funded under the Northern Water and Sewer Program during 2002/2003 appears as Appendix 5. A summary of projects funded under the Emergency Repair Program during 2002/2003 appears as Appendix 6.

5.3 Municipal Financing Corporation

The Municipal Financing Corporation offers loans to municipalities for upgrading of water and wastewater infrastructure. During 2002/2003 there were 13 projects financed by the Municipal Financing Corporation for upgrading of waterworks or related infrastructure.

The Municipal Financing Corporation will continue to offer loans to municipalities in the future.

Location	Amount
Town of Watrous	$228,272
Village of Kincaid	$150,000
Village of Elbow	$250,000
Town of Martensville	$540,000
Resort Village of Saskatchewan. Beach	$ 60,000
Village of Laird	$181,000
Village of Riverhurst	$126,000
Village of Marshall	$160,000
Town of Birch Hills	$250,000
Village of Grand Coulee	$ 45,000
Town of Esterhazy	$174,300
Village of Paddockwood	$ 77,000
Town of Leader	$322,000
Total	**$2,563,572**

5.4 Saskatchewan Water Corporation (SaskWater)

SaskWater was reorganized as part of the provincial Drinking Water Strategy, effective October 1, 2002 with proclamation of *The Saskatchewan Water Corporation Act, 2002*. The new SaskWater's mandate is to provide water, wastewater and related services to municipal, industrial, government and domestic customers in the province on a commercial basis.

SaskWater's water treatment business includes both stand-alone water systems and regional water supply systems. SaskWater owns and operates three stand-alone water treatment plants and two larger plants that produce treated water for the Humboldt-Wakaw and Codette Lake (Melfort) regional systems in central Saskatchewan.

Since October 2002, the corporation bought, upgraded and operates the water treatment system in the Village of Edenwold. SaskWater also enlarged its Saskatoon North treated water system, undertaking a $2.6 million expansion of the system to the Town of Hague.

5.5 Waterworks Construction Permitting Process and Status

Following the proclamation of *EMPA, 2002*, permitting of the construction and operation of municipal waterworks, certain pipeline systems and other waterworks with a design flow of greater than 18 cubic metres in any 24 hours became the responsibility of SE . Prior to the proclamation of *EMPA, 2002*, this role was predominantly the responsibility of SaskWater, with input from SE in the form of comments on applications. SH through the local health authority maintains its role for managing approval of construction and operation of waterworks governed under *The Health Hazard Regulations, 2002*. SWA's newly proclaimed Act, *The Saskatchewan Watershed Authority Act, 2002*, requires the Authority to regulate any works, such as dams or water conveyance facilities, prior to treatment.

A proponent who wishes to construct a waterworks regulated by SE is required to apply to SE for a Permit to Construct Waterworks issued pursuant to Section 23 of *EMPA*. Applications for construction are reviewed and SE's engineering staff who issue permits for construction with input from the regional EPO. Easements and interests must be registered on the titles of the affected land for any new works constructed or operated after October 1, 2002. In a case of alterations to existing waterworks where there is no change in water source or water treatment process, a parallel construction process is used.

From October 1, 2002, to March 31, 2003, SE has issued 20 Permits to Construct Waterworks. There are also another 13 construction permits pending as of the end of the fiscal year. The total cost of these projects is estimated at $6,850,000. The cost of project applied for but not yet permitted is estimated at $7,481,000. Table 5.5.1 provides a summary of waterworks projects applications during the October 1, 2002 to March 31, 2003 period.

Table 5.5.1: Summary of Waterworks Construction, Alteration or Extensions under *EMPA, 2002* – October 1, 2002 to March 31, 2003.

Client Name	Title of Work
Goodsoil	Water Treatment Plant Addition Construction Approval
Holdfast	Water Treatment Plant Project
Bridlewood Estates	Water Reservoir and Pump Station - Bridlewood Estates
Sunset View Beach	Potable Water Pail Fill Station
Leader	Water Treatment Plant Upgrade
Manitou Beach	Reverse Osmosis Water Treatment Plant
Allan S. Rural Pipeline	Low Pressure Water Pipeline Project
8th St. Waterline Group	8th Street Waterline Group
Fenwood	Water Treatment Plant Upgrade
SHL Rural Pipeline Association.	SHL Rural Pipeline Association Maryburg/Add-on
Southeast Corman Park Pipeline Association.	Southeast Corman Park Rural Water Pipeline
Eagle Rise Pipeline Association.	Eagle Rise Rural Pipeline Association
Tower Hills Pipeline Association.	Tower Hills Rural Pipeline Association
Yellow Head Pipeline Association	Yellow Head Rural Pipeline Association
Broderick	Broderick - Water Treatment Plant Upgrade
Kincaid	Kincaid - Water supply and treatment
Delisle	Delisle Water Treatment Plant
Saskatoon	Saskatoon - Water Treatment Plant Clarifier
Agrium - Vade Potash	Agrium - Vade Potash Potable Water Facility Upgrades
Maple Creek	Maple Creek - Springs Upgrade
Maple Creek	Maple Creek - UV installation
Air Ronge	Air Ronge Air Scrubber
Esterhazy	Esterhazy Air Scour System
Cogema	McClean Lake Operation - Potable Water Treatment
Hudson Bay	Hudson Bay Pail Fill Station
Moose Jaw	Water Line Crossing of Spring Creek
Killaly	Killaly Water Treatment Plant Upgrade
North Central PL	Doremy Project 2002 – Low Pressure Pipeline
Eight Mile Pipeline	Addition of Connections
Darling Beach	Water Works System
Cogema	McClean Lake Operation - Camp Potable Water Treatment
Swift Current	Water Supply Pipeline Twinning
North Battleford	Water Treatment Plant Baffle Upgrade

Prior to operation of any facility regulated by SE, a Permit to Operate must be obtained. Permits to Operate are issued by the regional EPO after completion of construction. A Permit to Operate lists conditions the monitoring schedule, data keeping and various operational requirements. The Permits to Operate are valid for two to five years depending on the type of facility. Permits to Operate waterworks are issued under Section 23 of *EMPA, 2002*.

Under Section 54 of *The Water Corporation Act*, SaskWater issued Approvals to Construct and Operate for water and sewage works throughout Saskatchewan until October 1, 2002. The permitting process was decentralized under SaskWater's authority. Applicants wishing to build or modify water and sewage works submitted design documents along with an Application for Approval to Construct and Operate

Works (Application) to SaskWater's regional Water Resource Offices or to Regulatory Standards and Approvals Branch. The Water Resource Office manager was required to sign the Approval to Construct with or without conditions, or reject the Application. Approvals to Operate were also reviewed and authorized by the regional office. Easements and permit notices were filed with Land Titles as required in many occasions. Complex projects were forwarded to SaskWater's Municipal Engineering section for review and comment. SE was asked to provide comment to SaskWater on water and wastewater applications and to issue limitation permits such as wastewater discharge permits.

Prior to the proclamation of EMPA, 2002, persons of differing technical backgrounds often reviewed similar construction applications and projects due to the decentralized permit authority. Under SE's new permit procedure a Professional Engineer always has central authority for an application. There has been an increase in the quantity and quality of design information required for a successful application due to the new SE acts, regulations and associated design guidelines.

From April 1 to September 30, 2002, SaskWater records show that 31 Approvals to Construct Works for water and wastewater projects were issued.

SWA issues Approvals to Construct Works, Water Rights Licence and Approvals to Operate. The Authority's Moose Jaw Office issues approvals for well construction, groundwater investigations, approvals to construct and operate works related to well and groundwater and groundwater allocation licensing. SWA's Water Resource Offices regulate works for surface water sources and raw water pipelines.

6. Laboratory Services and Accreditation

6.1 Laboratory Services

The Environmental Services (ES) section of the Provincial Laboratory (PL) provides analytical services for a wide range of bacteriological, chemical and physical testing of waters in Saskatchewan. Clients are mainly from provincial government agencies including HR, SE, SaskWater, SWA as well as municipalities, industries, engineers and private citizens. Testing performed in support of programs initiated by SE or Public Health Officials (PHO) are currently provided at no charge. Services provided for private water supplies are charged on a per sample basis.

Since the waterborne disease outbreak in Walkerton, Ontario, in May 2000, there has been an increased demand for water quality testing from the general public (i.e. individuals who use private wells and dugouts as a source of drinking water) and from publicly operated drinking water facilities. The PL has seen an 80 per cent increase in the number of samples submitted for bacteriological analysis of drinking water.

- about 500 water samples each week from publicly operated drinking water facilities, compared to 330 prior to Walkerton; and
- about 400 private water samples weekly, compared to 175 previously. The PL handles approximately 90,000 water tests per year.

During the period April 1, 2002 to March 31, 2003 the ES section of the PL carried out in excess of 91,000 tests on the 47,000 samples submitted for bacteriological analysis of drinking water.

6.2 Laboratory Accreditation

The Water Regulations 2002, marked the introduction of new requirements for laboratory accreditation. All laboratories which provide analysis of drinking water samples as required by a SE Minister's Approval or Permit to Operate must be accredited to the Standards Council of Canada "General Requirements for the Competence of Testing and Calibration Laboratories (IOS/IEC/17025-1999) CAN-P-4D, March 2002" as of March 31, 2004. Laboratory accreditation is valuable in assuring that results of analysis are representative.

As of March 31, 2002 the status of accreditation for laboratories performing water quality analysis was:

- Provincial Laboratories (Regina): Accreditation process underway;
- Saskatchewan Research Council (Saskatoon): Accredited;
- Enviro-test Laboratories (Saskatoon): Accredited;
- City of Saskatoon Laboratory: Accreditation process underway; and
- Buffalo Pound Filtration Plant Laboratory: Accreditation process underway.

The number of accredited laboratories is a performance measure for the LTSDWS. The measure provides an indication of the ability of laboratories to ensure high quality and representative analytical results that reflect the true quality of drinking water. Trends and discussion with laboratory managers indicate laboratories providing analytical services in Saskatchewan will meet the March 31, 2004 regulatory requirement

6.3 Rural Water Quality Advisory Program

The quality of potable water produced and delivered through municipal treatment and distribution systems in urban municipalities in this province is subject to regulatory monitoring by SE and SH. This serves to ensure the safety of drinking water for urban dwellers in the province, but similar monitoring of some 50,000 farm homes is not feasible from an operational or fiscal perspective. While individuals relying on their own private water supplies can obtain a fundamental analysis of their water supply through the PL, little advice has historically been available on the water treatment processes necessary to render their water safe and aesthetically suitable for general household use and human consumption.

In 1997, the province implemented the Rural Water Quality Advisory Program to address the concern over the lack of available assistance to the rural resident. Under the program, the client's raw surface or well water is sampled by a thoroughly trained and equipped technician in accordance with accepted protocols. The sample is properly preserved and shipped to an accredited laboratory for analysis. The analysis includes some 27 to 29 analytes, depending on whether it is surface or groundwater and the results are forwarded from the PL to the Water Quality Services office of SWA in Saskatoon. Based on the analysis and significance of those parameters which approach or exceed Saskatchewan's Drinking Water Quality Standards and Objectives, a detailed description of an economically feasible treatment system is provided. System designs are appropriate for improving the client's specific water supply to a quality suitable for safe general household use and human consumption. The letter report also outlined measures available for protection and improvement of the quality of the raw water at the source. Where one or more parameters in the client's water analysis are found to exceed provincial health objectives, a copy of the letter is sent to the Senior Public Health Inspector nearest to the client's residence.

Since its inception in 1997, the program has served a total of 2,027 rural clients, which translates to an actual rural population served of some 10,000 people. In 2002, 550 clients were served and indications are that annual demand is slowly growing. The growth in demand appears to be a function of both growing program awareness and growing awareness on the part of the rural public at large of the province's central water quality issues.

The analytical data obtained over the duration of the program reveals a broad variation in the quality of rural water supplies from untreatable to very good. Further, the accumulated data has provided initial indications that some important health issues – such as excessive arsenic concentrations exist in groundwater sources in several areas around the province. A more accurate location and delineation of these potential trouble areas will be available when SWA begins a spatial analysis of all of its data later in 2003 whereupon more location specific and concentrated public awareness efforts will be initiated.

7. Data Management - Environmental Management System (EMS)

The 2002-2003 fiscal year marked the initial development of a new integrated provincial water quality information system (EMS) as committed to in response to the North Battleford Commission of Inquiry (recommendations #13 and #14) and commitments made by government in the LTSDWS. Contributing partners included SE, SH, SaskWater, SWA, SAFRR, GRAA and Information Technology Office (ITO).

To fund the project, SE received a one-time allocation of $500,000 ($50,000 of which was designated for communication items) and an annual allocation of $200,000 to the ordinary budget for ongoing maintenance of the system (included one full time employee). The majority of these funds went toward consultant fees for analysis, design and build phases of the project.

ITO was able to contribute in all $430,000. Except for the $80,500 used for a Business Needs Analysis, these funds were used to purchase hardware/software necessary to house the EMS system.

7.1 Consultation and Business Needs Assessment Process

One of the first actions undertaken by the partners was to identify the functional requirements of a provincial water information system. The system's primary function would be to support regulatory decision-making processes and provide public access to compliance and water management information. EDS Ltd. was commissioned to undertake a Business Needs Analysis study (commenced May 13, 2002 and completed September 12, 2002) that supplied a framework for future work by the partners.

EDS, and partner representatives, conducted a series of workshops across the province designed to identify the business and operational requirements of the stakeholder agencies and departments with respect to water management. Using the results, an environmental scan was carried out to determine what water information systems and data standards were currently being used by other North American jurisdictions to address water information needs and how applicable each was to Saskatchewan's immediate needs.

Based upon the results of the EDS study and other supporting evidence, Alberta's Environmental Management System offered the best solution. It addressed the need for a comprehensive, integrated information system to meet government's operational requirements and it offered public access to water quality information via the Internet.

7.2 Environmental Management System Implementation and Status

EMS is a series of integrated data and information components that assist in the delivery of core water business activities. It is designed to support the Regulatory Business (administering legislation) and the Assessment Business (determining the state of the waterworks operations). A common data repository is provided so that the information collected by different business processes and business areas may be shared.

EMS is able to identify waterworks not meeting compliance standards listed on their permit to operate and will pass this information electronically onto regulatory agencies for action.

SE entered into an agreement (Letter of Understanding - LoU) with Alberta Environment for rights to use EMS. Alberta Environment holds proprietary rights to EMS. The LoU paved the way for the transfer of EMS software technology to SE.

Work on implementing EMS at SE began November 2002 with the execution of a GAP Analysis by LGS Ltd. (an IBM company). The GAP identified in detail the functional business importance that EMS must have and should have to meet regulatory and compliance necessities, and public access to drinking water information.

Design and build stages of the drinking water module of EMS began in January, 2003 and continued up to March 31, 2003. EMS will be available for SE regulatory and inspection staff by May, 2003.

7.3 Public Web Enablement (SaskH_2O.ca) and Status

The development of the public webpage (www.saskh2o.ca) for the Saskatchewan Water Information Management (SWIM) initiative was the responsibility of a Public Access Committee, lead by ITO, with contributing members from SE, SH, SAFRR, GRAA, SaskWater and SWA. As a temporary measure, the day-to-day webpage management will be supplied by SE and the website will be hosted on one of SE's web servers.

SaskH$_2$O.ca is intended to become a citizen-focused website that brings together, under one web address, information and services available from the government that relate to water, regardless of the department or agency that produces the information or offers the service. Its primary target is the public seeking information about the quality of the community's drinking water. However, the site has been designed to provide information to anyone interested in water quality and quantity issues. To that purpose, it incorporates information from all departments that share responsibility for water management.

It is anticipated public web access to drinking water quality information will "Go Live" late May, 2003.

7.4 Future Development of EMS to Protect Water Sources

Two additional EMS modules are proposed for design and build in fiscal 2003-2004.

7.4.1 Effluent Module:

It has long been recognized that municipal and industrial discharges can have serious consequences for the environment. The effluent or wastewater module will assist government in monitoring and regulating discharges into natural water ecosystems such as lakes and rivers and into underground aquifers. Similar to the EMS drinking water module, the effluent module will allow regulators to track what is being discharged, when it is being discharged and whether the discharge is in compliance with operational limits as specified on their permits. The information will be used in administering legislation and ultimately, protect drinking water sources and water quality in general. The public will be able to access effluent compliance and discharge information on the Website similar to drinking water information.

7.4.2 Site Facility Management Program Module (SFMP Tanks):

The SFMP module tracks and evaluates the equipment status of fuel, chemical and waste storage facilities (i.e. warehouses, above and below ground tanks, outdoor storage sites, etc.) across the province in relation to the requirement of *The Hazardous Substances and Waste Dangerous Goods Regulations* and will aid in upgrading requirements for these facilities.

Other uses of this module include land title searches for hazardous material sites by private and corporate interests, evaluate liability risk to government as well as clean up strategies/costs of abandoned sites, environment assessment searches by consultants and government agencies and importantly, protection of drinking water sources such as wells and surface water.

7.5 Saskatchewan Health Water Databases

In order to support the HRs in administering *The Health Hazard Regulations* sections addressing public water supplies, SH is developing a data management system which will capture information specific to the individual public water supplies that are regulated by SH (i.e. Rural Municipal Wells, tourist accommodations and small campgrounds). This system will form part of the current Public Health Inspector Information System (PHIIS) that is used by HR public health inspectors during their activities in other public health program areas (i.e. public eating establishments). The system will connect with the PL Laboratory Information Management Systems (LIMS) and will enable linkages of water test results specific to the SH regulated public water supplies. In addition, the system will capture information relating to water source type, system size, treatment, tests and compliance information. The PHIIS water system is expected to be implemented by January 1, 2004.

8. Protection of Source Waters

8.1 Saskatchewan Watershed Authority Source Water Protection Activities

SWA was created October 1, 2002 by reorganizing and merging the water management components of SaskWater, SE and the Saskatchewan Wetlands Conservation Corporation (SWCC) so the main focus was on effective management of watersheds and source water protection. Recommendation 26(b) of the North Battleford Commission of Inquiry report called for creation of a unit with a "mandate and jurisdiction to protect watershed and groundwater sources of drinking water". The third goal of Saskatchewan's LTSDWS is "High quality source waters are protected now and into the future". The formation of SWA addresses these needs. During the first six months of its existence SWA focused its energies on four main areas: establishment, delivery of ongoing programs, development of future plans and development of its Watershed and Aquifer Planning Model.

Watershed and aquifer planning will be a key activity in protecting source water. SWA planners will work with communities in watersheds to identify threats to water quantity and quality and agree on appropriate steps to reduce or eliminate those threats. The first watershed planning exercises will be initiated during the 2003-2004 fiscal year.

SWA has identified State of Watershed Reports as a very important new program and will document the health of each watershed. By identifying factors affecting the watersheds, and thus the water, the reports will identify issues to be considered in development of watershed plans. They will also, over time, serve to monitor progress in improving water supplies.

Water protection is everyone's responsibility and good stewardship is essential to protecting source water. SWCC (before October 1) and SWA (since October 1) have several programs to assist landowners in improving their stewardship and thus protecting water. Some of the highlights of this work included:

- 277 kilometres (172 miles) of streams and 4,896 hectares (12,100 acres) of wetlands enrolled in the Prairie Stewardship Program;
- demonstration projects were established on 5.6 kilometres (3.5 miles) of streams and 226 hectares (560 acres) of wetlands. That brought the yearly totals up to 6,191 hectares (15,300 acres) of native prairie, 19 kilometres (12 miles) of streams and 332 hectares (820 acres) of wetlands; and
- contacted 44 local agencies towards the goal of building a coalition to create a Moose Jaw Watershed Stewardship Association.

Prairie Water Care is a volunteer water-monitoring program, lead by SWA, designed to increase public awareness of the factors affecting water quality. There are now 13 groups of volunteers, including 4-H members, cottage owners, school students and landowners working to improve the health of their watersheds. A technical training binder has been developed for the monitoring groups including information on the water testing equipment, macro-invertebrate identification and riparian health. Water testing training sessions for volunteers were held at Beaver Creek, Moose Jaw and Crescent Creek.

Maintaining the infrastructure necessary to meet water supply needs is a critical aspect of source water protection. SWA is responsible for the operation and maintenance of 45 dams, approximately 130 kilometres of conveyance channels and other water management infrastructure throughout the province. These are all public benefit works and provide the people of Saskatchewan with essential water management functions including water for municipal and industrial use, irrigation, hydroelectric power generation, flood control, wildlife and recreation. Principal among the water control works are the Gardiner, Qu'Appelle, Rafferty and Alameda dams. The current estimated replacement cost of SWA's infrastructure is $1.27 billion.

As part of its program to upgrade the safety of its water management infrastructure, SaskWater and SWA completed the construction of a new concrete service spillway at the Avonlea Dam, improving safety for residents and others downstream of the dam as well as the security of water supplies to users including the Town of Avonlea, the Redthorpe rural pipeline utility, Dunnet Regional Park, Long Creek Golf Club and the Avonlea Irrigation District.

In addition to ongoing operation and maintenance needs, significant rehabilitation work was undertaken at Rafferty Dam and initiated at Alameda Dam. Since completion of its construction in 1992, consolidation of the fill and the foundation of Rafferty Dam had reduced its freeboard by up to 0.7 m below the design value. In mid-September, a contract was awarded to restore the project freeboard along with allowance for anticipated future settlement. This work was completed in mid-November at an approximate cost of $600,000.

In follow-up to the investigation and design of repairs needed at the low-level outlet gates at Alameda Dam in 2001 and 2002, replacement equipment was acquired and repairs were initiated in early 2003. The repairs are anticipated to be complete by early summer 2003 at an estimated cost of approximately $510,000.

Rehabilitation work was also undertaken at the following projects: Buffalo Pound Dam, Stelcam Weir, Emma Lake Diversion Channel, Pike Lake, Round Lake (Sinfield Reservoir) and West Poplar Dam. Dam safety investigations and project designs were also furthered at Gardiner Dam, Cowan Dam, Darmody Dam, Hugonard Dam, Katepwa Weir, Star City Dam, Teepee Creek Dam, Theodore Dam, Upper Qu'Appelle Channel and Wascana Weir.

During the fiscal year of 2002-03, approximately $5.4 million was spent on dam safety and project rehabilitation work by SaskWater and SWA. (Note this includes five quarters due to change in calendar year end for SaskWater staff transferred to SWA.)

SWA conducts and evaluates water supply studies to determine the capability of surface and groundwater sources to meet drinking water needs. When water sources are determined to be capable of supplying a new drinking water need, or an expanded existing need, SWA issues a Water Rights License to allocate the amount of water that can be used. New water allocations will only be issued when existing allocations will not be impacted.

In addition, SWA reviews and approves, if appropriate, applications to construct waterworks that are needed to access and transport raw water to treatment facilities. The process ensures the works to be constructed will properly access available water, will not create water supply access problems for other existing users and that the quality of the source water will not be compromised.

8.2 Quality of Surface Waters – Saskatchewan Environment -Water Quality Index

The quality of our ambient water resources is an important factor in assessing the viability of the water for any number of uses. One emerging tool, which will be of increasing value over the years, is the Saskatchewan Water Quality Index (SWQI). Although yet to be applied directly to surface water used as raw water supplies, the SWQI is also a good indicator of quality for this use. Information presented in Part 8.2 is based on surface water quality monitoring information collected and maintained by SE.

8.2.1 Saskatchewan Water Quality Index

The Canadian Water Quality Index (CWQI) was developed by a federal/provincial taskforce to provide a convenient means of summarizing complex water quality data and facilitating communications to a wide audience – from technical managers to the general public. The Index incorporates three elements: *scope* – the number of variables not meeting Saskatchewan's Surface Water Quality Objectives (SWQO); *frequency* – the number of times these objectives are not met; and *amplitude* – the amount by which the objectives are not met. The Index produces a number between 0 (worst water quality) and 100 (best water quality). In this way, the Index can be used to assess water quality relative to its desirable state (as defined by the SWQO) and to provide insight into the degree to which water quality is affected by human activity.

The Index has the flexibility to allow different users to select parameters, sites and time periods that are meaningful to their issues. At this time Saskatchewan's application of the Index – hereafter referred to as the SWQI - allows the user to evaluate water quality parameters against the SWQO in four categories or uses:

- Protection of Aquatic Life: uses a wide range of parameters necessary to support fish, insect and plant life;
- Irrigation: parameters that can adversely affect irrigated crops;
- Livestock Watering: includes parameters that can affect livestock growth and well being; and
- Recreation: evaluates the bacterial and aesthetic quality parameters of the water.

Once the Index value has been determined for a particular watershed use, water quality is ranked by relating it to one of the following categories:

- *Excellent*: (Index value 95-100) – water quality is protected with a virtual absence of threat or impairment; conditions are very close to natural or pristine levels;
- *Good*: (Index value 80-94) – water quality is protected with only a minor degree of threat or impairment; conditions rarely depart from natural or desirable levels;

- *Fair*: (Index value 65-79) – water quality is usually protected but occasionally threatened or impaired: conditions sometimes depart from natural or desirable levels;
- *Marginal*: (Index value 45-64) – water quality is frequently threatened or impaired; conditions often depart from natural or desirable levels; and
- *Poor*: (Index value 0-44) – water quality is almost always threatened or impaired; conditions usually depart from natural or desirable levels.

Index results in the 'Protection of Aquatic Life' and 'Livestock Watering' categories for several of Saskatchewan's major river basins are presented in the following section.

8.2.2 SWQI for Major Waterbodies in Saskatchewan

SE has applied the SWQI to three of the major watersheds in Saskatchewan: South Saskatchewan, North Saskatchewan and Qu'Appelle rivers. The SWQI was applied for two uses and their associated objectives: Aquatic Life and Wildlife Protection and Contact Recreational Uses.

Objectives for protecting the quality of the habitat of aquatic organisms including fish, aquatic fauna and flora, are more stringent than those applicable to other water uses. These objectives, used in the SWQI, (Table 8.2.2.1) will afford protection of fish and other aquatic life at all stages of development. Because of the relatively stringent values for the various constituents these objectives will also likely afford protection to wildlife that rely upon surface water for drinking water and their source of food supply.

Contact recreational uses of water concerns those activities that involve direct contact between the human body and surface water for prolonged periods. It can also include activities where ingestion/inhalation of surface water is likely to occur. Such activities include swimming, water skiing, bathing and wading. These objectives, used in the SWQI, (Table 8.2.2.2), will afford reasonable protection of water users from waterborne disease and maintain desirable aesthetic conditions in the water body.

Table 8.2.2.1: Objectives of the SWQI for Aquatic Life

Water Quality Parameter	Objective
Chloride - Dissolved	100 mg/L
Arsenic - Total	0.05 mg/L
Chromium - Total	0.02 mg/L
Nitrogen - Total Ammonia	Based on pH and Temperature
Mercury	0.0001 mg/L
Sodium - Dissolved	100 mg/L
PH	6.5 – 8.5
Oxygen - Dissolved	5 mg/L
2' 4-D	0.004 ug/L
MCPA	0.025 ug/L

Table 8.2.2.2: Objectives of the SWQI for Recreational Use

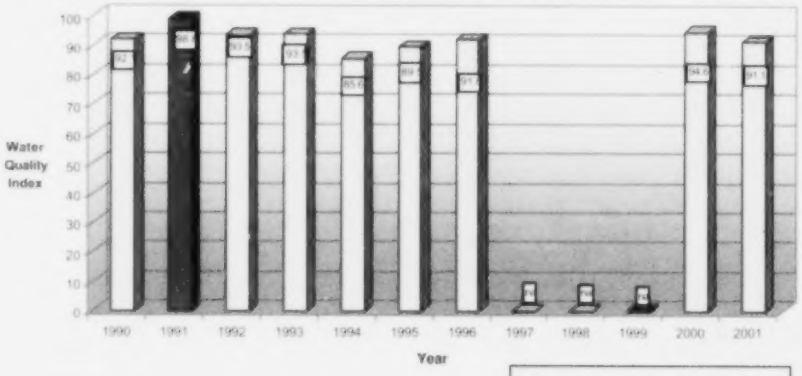
Water Quality Parameter:	Objective:
Fecal Coliforms	< 200 per 100 mL
Clarity	Water clear to depth of 1.2m

South Saskatchewan River

The South Saskatchewan River is a broad, swift-flowing river that originates in the Rocky Mountains and flows eastward into Saskatchewan, entering the province near the Town of Leader. It then flows in a northeasterly direction and joins the North Saskatchewan River just east of Prince Albert. Lake Diefenbaker, created by the completion of Gardiner Dam and the Qu'appelle Valley Dam in 1967, is the major storage reservoir on the South Saskatchewan River. Major water uses in this system include irrigation, power generation, municipal and industrial water supply, recreation, flood control, sport and commercial fishing and wildlife habitat. Lake Diefenbaker and the South Saskatchewan River form the largest supply of good quality water in southern Saskatchewan.

Figure 8.2.2.1 shows the mean annual SWQI in the Protection of Aquatic Life Category for the entire South Saskatchewan River for the years 1990 to 2000. The SWQI numerical ratings for the river ranged from 85.6 to 98.8, which correlate to Good to Excellent conditions for the protection of fish and other aquatic life. There was very little variation in the ratings over the study period. In this case, the SWQI could not be applied to the years 1997 to 1999 because insufficient water quality data were available.

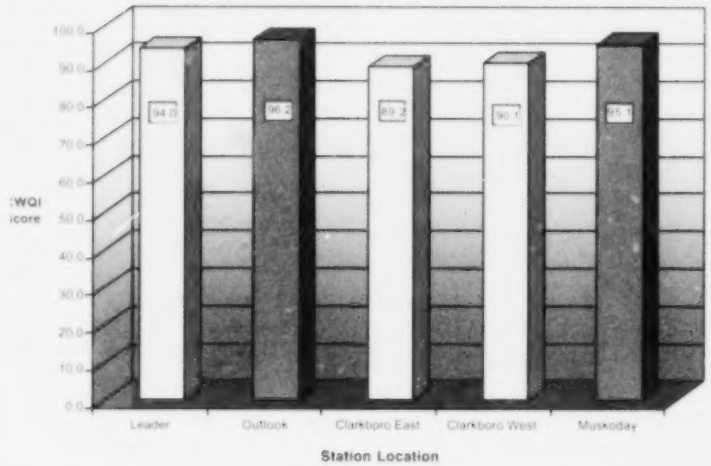
Figure 8.2.2.1: South Saskatchewan River Aquatic Life ~ Water Quality Index



Excellent: 100 – 95
Good: 80 – 94
Fair: 60 – 79
Marginal: 45 – 59
Poor: 0 - 44

The average SWQI (Protection of Aquatic Life) ratings for five specific locations on the South Saskatchewan River are shown in Figure 8.2.2.2, with Leader being the most upstream sampling station and Muskoday the farthest downstream site. Again, water quality data collected during the period 1990 to 2000 were used to determine these ratings. There was very little variation from one station to another in a downstream direction, with all sites ranging from Good to Excellent condition for the protection of aquatic life.

Figure 8.2.2.2: Canadian Water Quality Index Rating for Aquatic Life on the South Saskatchewan River



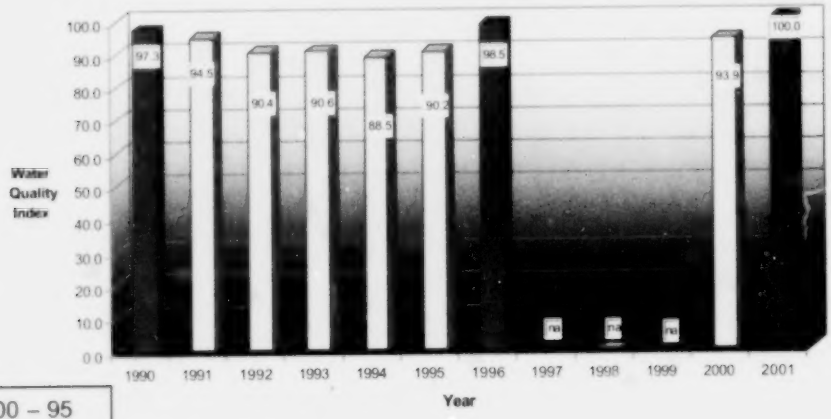
North Saskatchewan River

The North Saskatchewan River originates from snow and glacial melt waters in the eastern Rocky Mountains of Alberta, flows through the City of Edmonton and enters Saskatchewan near Lloydminster. From there it flows in an easterly direction past the cities of North Battleford and Prince Albert and then joins the South Saskatchewan River. Some of the uses of the river include municipal and industrial water supply, recreation, irrigation, livestock watering and fish and wildlife. The river also receives treated wastewater from municipal and industrial sources.

Figures 8.2.2.3 and 8.2.2.4 show the mean SWQI in the Protection of Aquatic Life Category for the entire North Saskatchewan River and for four stations on the river for the period 1990 to 2001. The SWQI numerical ratings ranged from 88.5 to 100.0, which correlate to Good to

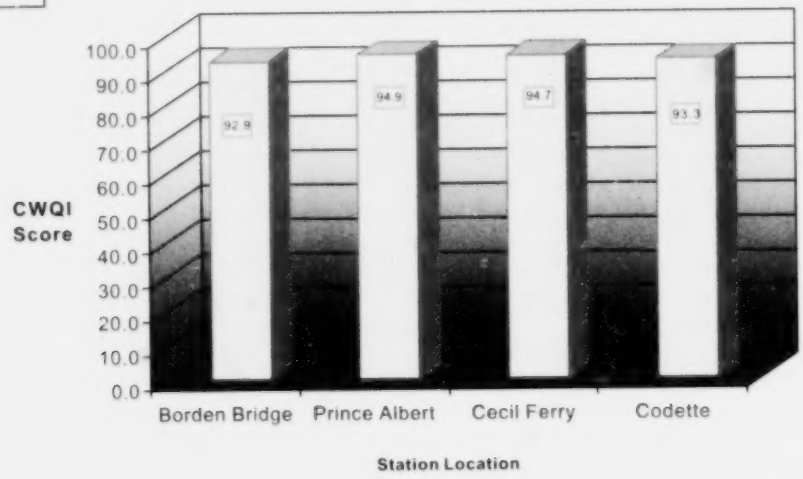
Excellent conditions for the protection of fish and other aquatic life in this waterbody. Again, the SWQI could not be applied to the years 1997 to 1999 due to insufficient water quality data.

Figure 8.2.2.3: North Saskatchewan River Aquatic Life Water Quality Index



Excellent: 100 – 95
Good: 80 – 94
Fair: 60 – 79
Marginal: 45 – 59
Poor: 0 - 44

Figure 8.2.2.4: Canadian Water Quality Index for Aquatic Life on the North Saskatchewan River

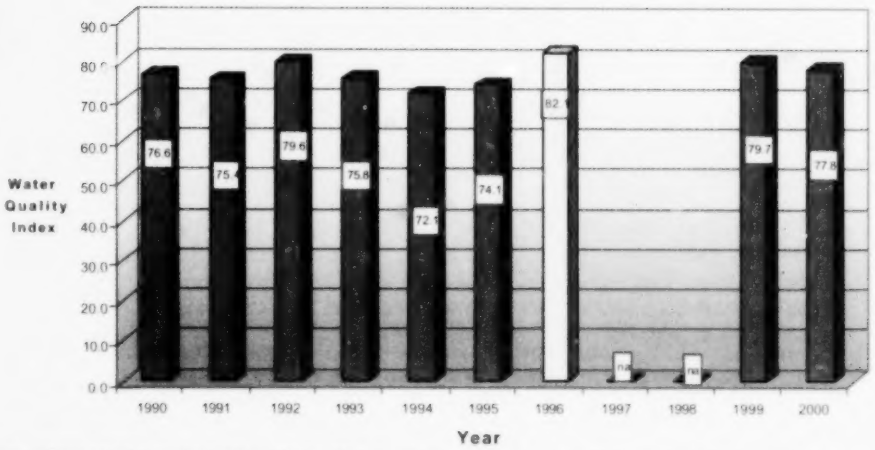


Qu'Appelle River

The Qu'Appelle River originates at the Qu'Appelle Valley Dam on Lake Diefenbaker and flows eastward to join the Assiniboine River near St. Lazare, Manitoba. Like most prairie rivers in semi-arid climates, the Qu'Appelle under natural conditions is an intermittent system with runoff from snowmelt as its major source of flow. Major water quality concerns in the Qu'Appelle stem from excessive growths of algae and aquatic plants in the lakes and input of nutrients from man-made sources. Poor water quality has occasionally limited recreational use of the Qu'Appelle lakes during summer.

Figure 8.2.2.5 shows the mean annual SWQI ratings (Protection of Aquatic Life) for the Qu'Appelle River over the period 1990 to 2000. The years 1997 and 1998 were omitted due to insufficient data. Overall, the ratings ranged from 72.1 to 82.1, corresponding to a description of Fair to Good condition. In this case, there are some factors that may occasionally impair the water for use by aquatic life. These likely relate to inputs of treated wastewater along the system, or periodic declines in dissolved oxygen levels due to the decomposition of aquatic plants. Figure 8.2.2.6 shows the SWQI declined significantly at the Highway #11 and Edenwold stations on the Qu'Appelle, falling into the Marginal range.

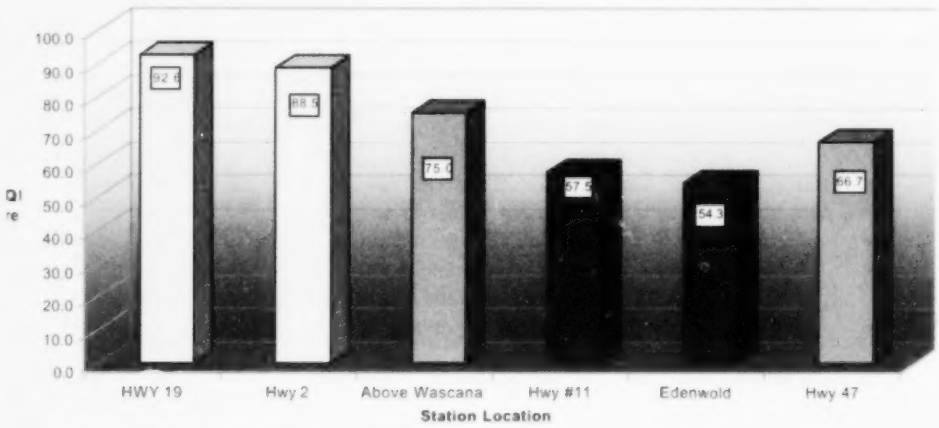
Figure 8.2.2.5: Qu' Appelle River Aquatic Life ~ Water Quality



Excellent: 100 – 95
Good: 80 – 94
Fair: 60 – 79
Marginal: 45 – 59
Poor: 0 - 44

Implementation of the Water Quality Index (WQI) was a performance measure of the LTSDWS. The WQI provides a useful way to summarize complex water quality data and thereby provide ratings of water basins that may represent a better source of drinking water. As of March 31, 2002 the SWQI was under development. As of the end of the 2002-2003 fiscal year, SE has implemented the WQI for three major river basins in the province as indicated by the information provided above. SE is presently in the process reviewing and reinitiating monitoring of surface waters in the province. The SWQI is a trend assessment tool and therefore directly represents changes to water quality over time and distance along a river run or watershed. Trends and changes in the SWQI may be influenced by natural causes such as dry or wet years, or may be due to human activities such as recreational water use or wastewater disposal. Rapid change in water quality in ecosystems may also be "masked" by factors such as nutrient "sinks" which retain nutrients over prolonged time periods, and to some degree hide upstream water quality improvements. Ongoing monitoring and increased watershed management will result in water quality improvement in the future.

Figure 8.2.2.6: Canadian Water Quality Index Rating for Protection of Aquatic Life on the Qu' Appelle River



8.3 Saskatchewan Agriculture, Food and Rural Revitalization (SAFRR) Source Water Protection Initiatives

Approval of Waste Storage and Waste Management Plans for Intensive Livestock Operations (ILOs)
The Intensive Livestock Provisions of *The Agricultural Operations Act* requires that intensive livestock operations operate according to plans approved by SAFRR. Fifty-seven ILOs received approval of plans which will ensure those ILOs do not adversely affect water quality. Large ILOs are re-inspected on an audit basis, to ensure compliance with approved plans.

Spirit Creek Watershed Monitoring Committee (SCWMC)
SAFRR established the SCWMC to monitor the water quality along Spirit Creek which flows into Good Spirit Lake. This watershed includes a large intensive livestock operation. The committee, with technical assistance from several government agencies, is monitoring water quality in the watershed to ensure that no adverse impacts occur as a result of the ILO.

Water Quality Monitoring with SE
SAFRR and SE cooperate to monitor surface water near selected ILOs across Saskatchewan. Surface water quality is monitored during spring runoff and to date no impact on surface water quality resulting from operations of the ILOs has been measured.

Riparian Area Management Demonstrations
Staff from SAFRR along with staff and program funds from SWA have provided assistance to demonstrate the effectiveness of relocating extensive and intensive livestock operations away from creeks and rivers. Demonstration sites showing the benefits include the Whitesand River, Bone Creek and Swift Current Creek.

Pesticide Applicator Licensing
The licensing of Pesticide Applicators ensures a broad range of environmental cautions including water protection are recognized when applying pesticides. In 2002/2003 1,893 pesticide applicators were licensed.

Agriculture Development Fund (ADF) Research Projects
SAFRR through the ADF has funded research projects that focus on the long-term sustainable storage and management of manure. Results of the research projects form the basis of regulatory standards for the safe storage and use of manure. Examples include:

- Long Term Performance of Earthen Manure Storages in Saskatchewan-Fonstad et al;
- The Long-Term Effect of Repeated Application of Hog Manure on Soil Productivity and on the Quality of the Environment in Semi-Arid regions of Saskatchewan-Grever et al; and
- Influence of Hog Manure Application on Water Quality and Soil Productivity-Maule et al.

Federal/Provincial Agricultural Policy Framework
Saskatchewan's signing of the federal/provincial Agriculture Policy Framework (APF) will lead to significant resources being dedicated to environmental initiatives including the reduction of agricultural risks to the health and supply of water. Priority issues are nutrients, pathogens, pesticides and water conservation.

The federal and provincial governments will work with industry toward:

- completion and implementation of environmental scans and environmental farm plans for all farms; and
- adoption of environmentally beneficial practices in management of nutrients, pests, nuisances, land and water.

Proposed implementation measures will include:

- enhanced information and awareness about environmental issues;
- development of an on-farm environmental planning tool and process; and
- programs offering cost-sharing as incentive for accelerated adoption of actions that will address environmental concerns.

The Greencover Canada Program is a key program under the APF. It is a five-year, $110 million national initiative designed to improve grassland management practices, protect water quality, reduce greenhouse gas emissions and enhance biodiversity and wildlife habitat. Greencover will deliver technical and financial assistance for water quality protection, land conversion, improved grassland management practices, reduced greenhouse gas emissions, enhanced biodiversity and improved wildlife habitat. The program will offer landowners a package of options through four program components:

- Land Conversion - converting environmentally sensitive cultivated land to perennial cover;
- Technical Assistance – information about beneficial management practices applicable to rangeland, forage land and riparian areas to accelerate adoption of these practices;
- Shelterbelts – assistance to encourage planting of trees on agricultural land; and
- Critical Areas – financial incentives to help improve the health and function of riparian area.

It is anticipated that an environmental farm plan will be required in order for a producer to qualify for cost sharing of activities associated with adoption of beneficial management practices under the critical areas component. Eligible activities and cost-sharing amounts are still under development, but could include adoption of practices such as watering systems to manage livestock access, buffer establishment and management, grazing management near water bodies, relocation of livestock wintering facilities, winter site management, restoring and establishing native rangeland, watercourse improvement and gully restoration and exotic invasive plant management.

Additional incentives will be offered under the Environment Chapter of the APF for adoption of beneficial management practices in the areas of air, soil, water and biodiversity. Provincial scans are underway to identify priority areas and worst problems.

8.4 Saskatchewan Government Relations and Aboriginal Affairs (GRAA)

As directed by the government's LTSDWS, by 2007, all municipalities will be required to have in place bylaws and water protection plans to protect drinking water supplies. In 2002-2003, GRAA initiated a review of *The Planning and Development Act, 1983 and The Subdivision Regulations* and began developing statements of provincial interest and options for planning systems in Saskatchewan. Changes to the Act and regulations will include requiring municipal planning bylaws to include policies and regulations for water source protection and requirements for water systems with new developments and upgrades to existing developments. Consultations will be undertaken in 2003-2004.

Working with the Saskatchewan Association of Rural Municipalities, SARFF, Agri-Vision and the livestock industry, GRAA assisted in the development of a model zoning bylaw for intensive livestock operations that includes municipal authority to address water source protection. The model bylaw establishes a process for rural municipalities to review development proposals for intensive livestock operations that takes into consideration the many competing interests. The approach used for the pilot project includes a number of municipalities and was effective in encouraging an inter-municipal approach to planning bylaws.

The number of municipalities with bylaws and watershed protection plans that protect their drinking water supplies is a performance measure for the LTSDWS. Bylaws and water protection plans are seen as aiding in working towards safer drinking water supplies. As of December 2001, there were less than 10 per cent of municipalities that had bylaws or protection plans in place. Legislative changes to put these requirements in place are planned for 2004 or 2005.

The number of municipalities with pricing and capital investment strategies for their waterworks systems is also a performance measure for the LTSDWS. This measure pertains to the long-term financial

sustainability of municipal water systems. As of December 2001, less than 5 per cent of municipalities had pricing and investment strategies in place. Regulations are currently being drafted which will require pricing and capital investment policies to be put in place by 2005.

9 Public Education and Inquiries

9.1 Drinking Water Public Education Initiatives

An inter-departmental Water Committee was established in advance of the LTSDWS to better focus planning and implementation of water education activities among the different agencies. The committee was co-chaired by SE and Executive Council Communications and comprised of representatives from SWA, SaskWater, SH, SARFF and GRAA.

A brochure "From Source to Tap" was produced and widely distributed to Saskatchewan residents.

Each agency shared its public education plans for the year. Information included target groups, key messages, delivery vehicles and budget, which was designed to create a greater awareness of any duplication, gaps and potential economies of scale in the information being made available to the public. This Committee has evolved into a group co-chaired by Executive Council and SE. Its plans now include serving as a platform for the development of an inter-agency public education strategy.

Project WET, an educational program for teachers, now housed within SWA and supported by the Canadian Water Resources Association and Saskatchewan Learning continued to train facilitators around the province. Project WET was also promoted at a number of trade shows held this year.

A group called the Public Access Committee (reporting to the Water Communications Committee) representing various government agencies participated in the development of a Saskatchewan Water Information Management web site designed to bring together at one site, information on government programs and services relating to water. The site will feature links to the department responsible to assist residents requiring further information or assistance. Information contained in the site will provide support to the SASKH20 toll-free inquiry line.

The LTSDWS also included reference to the need to provide increased educational information available to owners of small private water systems, such as on farms. The information will include the need to sample and properly maintain and treat their water systems. Saskatchewan is working with other agencies with drinking water programs in developing water fact sheets that will be used by the various agencies for public education.

Information contained in the site will provide support to the SASKH20 toll-free inquiry line.
As part of the changes to *The Planning and Development Act, 1983 and The Subdivision Regulations*, Saskatchewan GRAA will be providing municipal education and training initiatives to help municipalities establish water source protection practices and bylaws.

GRAA's regulatory functions for subdivision and municipal bylaw approvals provide ongoing advice and awareness to municipalities and the general public regarding water source use and protection.

9.2 Public Consultation and Communication

During the fiscal year, SE delivered in excess of 25 public presentations at various events and venues aimed at consulting or informing its clients and the public on various drinking water issues related to the LTSDWS, legislative and regulatory changes and new protocols and activities. A television Public Service Announcement (PSA) was produced and distributed on the disposal of household hazardous wastes in a way that protects water. At the end of the fiscal year, the 2001-2002 Drinking Water Compliance Report was released to communities and the public outlining overall compliance of Saskatchewan's municipal water systems and showing significant improvements in meeting drinking water quality objectives.

Through a work planning process, SWA conducted an extensive consultation process targeted at important partners. SWA conducted a consultation process with 17 external partners.

In addition, SWA wrote to a wide range of stakeholders to inform them of creation of SWA and set up displays at six tradeshows and meetings and made presentations to 14 groups to explain its mandate. SWA obtained nominations from stakeholder groups for the Authority's Advisory Committee, which will be established in 2003/2004.

During the fiscal year, GRAA informed key municipal stakeholders and the general public about the provincial government's drinking water strategy and the municipalities' responsibility for ensuring that their citizens have safe drinking water. These messages were provided through ministerial speeches at municipal association meetings and other events. Also, CSIP announcements and events included messages relating to the drinking water strategy.

A government article on "Our Water—Source to Tap" was included in the November 2002 edition of *Municipalities Today* that provided information on providing safe drinking water.

9.3 1-800-SASK H2O

As part of the LTSDWS, SWA manages a toll-free inquiry line (1-866-SASK H20) to provide general information and a referral service in response to public inquiries on all water-related issues. The number is intended to provide convenient "one-window" service on water questions, enhancing government's accessibility and responsiveness.

Based on records from SWA, from the implementation of the toll free line in June until the end of the fiscal year, 258 calls were handled. The inquiries received ranged from issues on water quality and testing, treatment, storage, supply and distribution, the Rural Water Quality Program, the Pumping Equipment Program and hook ups to municipal systems. As the following table shows, the number of calls has gradually increased. The large jump in calls in October followed distribution of the "Drinking Water Source-to Tap Solutions" document.

Month	Number of Calls for Month	Running Total of Calls
June 2002	4	4
July 2002	8	12
August 2002	13	25
September 2002	0	25
October 2002	123	148
November 2002	52	200
December 2002	19	219
January 2003	9	228
February 2003	13	241
March 2003	17	258

9.4 Public Opinion Research

Public Opinion research done by Environics International in its Environmental Monitor released in December 2002 shows water pollution to be the key environmental concern of people in Saskatchewan. This same poll shows that in general Canadians link environmental health to personal health. Six in 10 Canadians now think their health is affected a great deal (29 per cent) or a fair amount (32 per cent) by environmental problems. However while the majority of Canadians clearly continue to think that

environmental problems affect their health at least a fair amount, the percentage of people thinking this way declined for the first time in this poll. That having been said, when asked what impact they think environmental problems will have on the health of our children and grandchildren, nine in 10 Canadians say either a great deal (59 per cent) or a fair amount (29 per cent).

A survey conducted for SE by Decision Research and released in October of 2002 shows that Saskatchewan residents consider water quality the second most important environmental issue in their community. When asked to choose the single most important issue, 20.5 per cent listed water quality, while 23.2 per cent chose air pollution. Respondents were also given a list of 19 environmental issues and asked to rate the importance of these each in terms of how the they were personally affected. The categories moved from a ranking of not at all important to very important. Eighty-five per cent of the respondents gave water the highest rating of importance. As in the Environics poll, residents consider the main benefit of protecting the environment to be the impact it will have on health.

9.5 Guideline and Standard Development

During the 2002-2003 fiscal year, SE developed and revised a number of guidelines and standards as a means to aid waterworks owner and operators understand and implement the requirements of *The Water Regulations, 2002*. These standards and guidelines were printed and copies were assembled into a "Drinking Water Information Binder" in a format that can be updated in the future. The binder also contained copies of *The Environmental Management and Protection Act, 2002* and *The Water Regulations 2002*. Late in the fiscal year, SE staff began to distribute a copy of this binder to each waterworks regulated by the department and it will also be available on CD early in the 2003/2004 fiscal year.

Standards, guidelines and fact sheets found in the binder include:

- Bacteriological Follow-up Protocol for Waterworks Regulated by Saskatchewan Environment, EPB 205
- A Guide to Waterworks Design, EPB 201
- Municipal Drinking Water Quality Guidelines, EPB 202
- Guidelines for Sewage Works Design, EPB 203
- A Guide to Aquatic Nuisances and Their Control, EPB 47
- Industrial Works Construction Application Standards, EPB 204
- Saskatchewan Water and Wastewater Works Operator Certification Standards, 2002, EPB 139
- Saskatchewan's Drinking Water Quality Standards and Objectives, EPB 207
- Trihalomethanes (Fact Sheet), EPB 211
- Microbiological Quality: Understanding Drinking Water Quality and Management (Fact Sheet), EPB 197
- Chlorine and Water Disinfection, EPB 211
- Cryptosporidium and Giardia lamblia (fact sheet), EPB 221
- Water and Wastewater Operator Program Guide, EPB 144
- Available Training and Reading for Water and Wastewater Operators, EPB 149
- Introduction to Surface Water Treatment (fact sheet), EPB 224
- Introduction to Iron and Manganese Removal (fact sheet), EPB 223
- Example waterworks logs and record sheets, EPB 219

SE staff also drafted the following standards, guidelines and fact sheets for addition to the Drinking Water Information Binder early in the following fiscal year.

- Waterworks Assessment Standards, EPB 233
- Emergency Response Planning Template and Guidelines, EPB 241
- Quality Assurance/Quality Control Template and Guidelines, EPB 242
- Hygienic Water Use (fact sheet), EPB 232
- Consumer Notification Guidelines and Templates, EPB 236

Further development of guidelines and standards is planned to the 2003-2004 fiscal year.

9.6 Recommendations and Actions Arising from the North Battleford Commission of Inquiry

On April 5, 2002, Justice Robert Laing released the "Report of the Commission of Inquiry into matters relating to the safety of the public drinking water in the City of North Battleford, Saskatchewan". The report was the outcome of an inquiry into events surrounding the contamination of the City of North Battleford by a protozoan parasite *Cryptosporidium parvum* which was discovered in late April 2001.

The Commission of Inquiry and report examined and recounted:

- the circumstances that lead to the incident;
- the adequacy and effectiveness of actions by officials of the Government to Saskatchewan, the Battlefords District Health Board and the City of North Battleford leading up to and in response to the discovery of contamination of the water supply;
- the effect, if any, of the regulations, by-laws, policies, guidelines, procedures and practices of or applicable to the Government of Saskatchewan, the Battlefords District Health Board and the City of North Battleford on the above noted events; and
- any other relevant matters that the Commission considered necessary to determine that the City of North Battleford's public water supply is safe in the future.

The Commission held hearings over various periods from September 2001 to January 2002. The Commission produced a report which documented significant details and offered a summary containing 61 findings and 28 recommendations. On April 5, 2002, the Government of Saskatchewan accepted all recommendations directed at it and concurred with the recommendations directed at the City of North Battleford. As of the end of the 2002-03 fiscal year, all recommendations directed at the Government of Saskatchewan as represented predominantly by SE, SH and HR, were either implemented or in the process of being implemented. A comprehensive listing of each recommendation, actions taken and the status of each at the end of the fiscal year is provided in Appendix 7.

Appendix 1: Summary of Saskatchewan Environment (SE) Regulated Waterworks Exceedence Details 2002-2003

Note: This table provides information only for those waterworks regulated by SE which had significant exceedences of water quality standards or sample submission requirements during the 2002/2003 fiscal year. Water quality standards Trihaolmethanes (THM), Arsenic, Boron, Fluoride, Lead, Nitrate, Selenium, Benzo(a)pyrene and Uranium at existing waterworks are phased in over 4 to 8 years depending on the population served by the waterworks.

COMMUNITY	Bact % Submitted	Bact % Positive	% Proper Chlorine	THM Annual Average (mg/L)	ARSENIC > 25 ug/L	BORON > 5.0 mg/L	FLUORIDE > 1.5 mg/L	LEAD > 0.01 mg/L	NITRATE > 45 mg/L	SELENIUM > 0.01 mg/L	URANIUM > 20 ug/L	BAP >0.01 ug/L
ABERDEEN	88	0	100									
ABERNETHY	85	9	91									
AGRIUM VANSCOY	0	0	0									
AIR RONGE	102	2	100	102								
ALBERTVILLE	92	17	100									
ALIDA	96	0	84									
AMSTERDAM	85	0	64									
ANEROID	77	0	10									
ANTLER	108	7	100	347								
ARBORFIELD	102	6	98	215.75								
ARELEE	85	9	85									
ARRAN	62	0	100									
AYLESBURY	100	0	0									
AYLSHAM	96	0	86									
BALGONIE	104	0	100							0.016		
BANKEND	92	0	0									
BARRIER WATER GROUP	62	13	0									
BATTLEFORDS PROV.PK.	94	0	37									
BEATTY	31	0	100									
BEAUBIER	100	29	24						56.25			
BELLEGARDE	69	11	100									
BENSON	181	15	38	213								
BESANT CAMPGD.	38	20	67									
BETHUNE	102	0	6	35.34								
BIG BEAVER	162	10	0									
BIG RIVER	102	2	93				2.133					
BIGGAR	106	0	87									

COMMUNITY	Bact % Submitted	Bact % Positive	% Proper Chlorine	THM Annual Average (mg/L)	ARSENIC > 25 ug/L	BORON > 5.0 mg/L	FLUORIDE > 1.5 mg/L	LEAD > 0.01 mg/L	NITRATE > 45 mg/L	SELENIUM > 0.01 mg/L	URANIUM > 20 ug/L	BAP >0.01 ug/L
BLADWORTH	100	0	**42**									
BORDEN	108	0	**86**									
BRACKEN	92	4	100	**106**								
BRANCEPETH	92	4	97	**398.34**								
BROADVIEW	104	**15**	100									
BROOKSBY	**81**	10	100	**216.67**								
BROWNLEE	**69**	0	100									
BRUNO	**77**	8	100	69.5								
BUCHANAN	102	8	93	**168**								
BUFFALO NARROWS	102	6	96	**105.67**								
BULYEA	**65**	**18**	100									
BURSTALL	119	3	**0**									
CABRI	102	0	**89**	76.75								
CADILLAC	**88**	0	100									
CALDER	**81**	0	**0**									
CANDIAC	**85**	**36**	**0**									
CANORA	96	2	92	13			**1.84**					
CARMICHAEL	108	0	**0**									
CARONPORT	96	0	**86**									
CENTRAL BUTTE	98	**12**	100									
CEYLON	108	5	100	**134**								
CHAMBERLAIN	104	7	**34**									
CHELAN	200	8	**75**									
CHURCHBRIDGE	94	6	**81**									
CLAVET	**83**	0	100	44.67								
CLIMAX	**88**	**13**	90								**31**	
CODERRE	**85**	0	**45**									
COLE BAY	94	10	96	**107.34**								
COLEVILLE	108	4	**79**									
COLGATE	**88**	0	**0**	**238.67**								
COLONSAY	**88**	0	100									
CONGRESS	100	4	100	**266**								
COPPER SANDS T.C.	185	8	**0**									
CORMAN PARK PIPELINE SE	**46**	0	**67**									

COMMUNITY	Bact % Submitted	Bact % Positive	% Proper Chlorine	THM Annual Average (mg/L)	ARSENIC > 25 ug/L	BORON > 5.0 mg/L	FLUORIDE > 1.5 mg/L	LEAD > 0.01 mg/L	NITRATE > 45 mg/L	SELENIUM > 0.01 mg/L	URANIUM > 20 ug/L	BAP >0.01 ug/L
CRAIK	96	0	80	178								
CRAVEN	162	5	7									
CREELMAN	121	16	92	255.67								
CROOKED RIVER	96	4	100	184.67								
CRYSTAL LAKE	54	29	100									
CRYSTAL SPRINGS	108	21	100									
CUMBERLAND HOUSE	52	11	93	97								
DALMENY	102	0	100	159.34								
DANA	85	9	100									
DANIELSON PROV.PK./MAIN	31	0	100	135								
DAVIN	77	10	100									
DEER VALLEY ESTATES	104	4	69									
DEMAINE	92	17	65									
DENZIL	96	0	48									
DILKE	100	0	0									
DINSMORE	100	0	4				2.2					
DODSLAND	100	0	100				1.69					
DORE LAKE	96	20	94	155								
DORINTOSH	92	0	86									
DRAKE	88	4	100									
DRINKWATER	96	12	100	72								
DUBUC	92	0	0									
DUCK LAKE	98	10	89									
DUCK MT PPK B-PICKEREL PT	65	12	95									
DUFF	185	4	88									
DUVAL	92	4	28									
EARL GREY	104	0	0									
EASTEND	102	4	98	113								
EATONIA	94	2	0	8								
EBENEZER	108	0	86									
ECHO VALLEY CONF.CENT.	71	8	87									
EDENWOLD	110	11	100	187.67								
EDGELEY	146	0	79									

COMMUNITY	Bact % Submitted	Bact % Positive	% Proper Chlorine	THM Annual Average (mg/L)	ARSENIC > 25 ug/L	BORON > 5.0 mg/L	FLUORIDE > 1.5 mg/L	LEAD > 0.01 mg/L	NITRATE > 45 mg/L	SELENIUM > 0.01 mg/L	URANIUM > 20 ug/L	BAP >0.01 ug/L
ELBOW	98	2	44	59.67								
ELDERSLEY	92	8	100	111.34								
ELSTOW	88	0	0	41								
ENDEAVOUR	81	5	52									
ERNFOLD	62	13	100									
ERWOOD	100	12	100	124.67								
ESTEVAN	126	1	77	135								
ESTON	102	0	96	109.25								
EVESHAM	38	0	100									
EYEBROW	69	22	32						74	0.032		
FAIRHOLME	100	15	100									
FAIRLIGHT	115	0	19									
FAIRY GLEN	58	20	100	174								
FENWOOD	85	0	100									
FERLAND	92	8	100			5.7	2.3					
FILLMORE	146	3	44								21	
FINDLATER	92	0	58									
FLAXCOMBE	92	0	0									
FLEMING	102	8	100	368.75								
FOSSTON	85	9	100									
FOX VALLEY	100	0	100								32.5	
FRENCHMAN BUTTE	100	15	40									
FROBISHER	115	17	54									
FRONTIER	115	0	93				2.46					
GARRICK	92	0	8									
GLADMAR	77	0	20									
GLASLYN	77	5	86									
GLEN EWEN	92	0	36									
GLEN HARBOUR	77	0	100									
GLENAVON	88	0	0									
GLENSIDE	77	30	54									
GOLDEN PRAIRIE	85	9	100									
GOOD SPIRIT PROV.PK.	44	13	67	275								
GOODEVE	85	5	100	113.67								

COMMUNITY	Bact % Submitted	Bact % Positive	% Proper Chlorine	THM Annual Average (mg/L)	ARSENIC > 25 ug/L	BORON > 5.0 mg/L	FLUORIDE > 1.5 mg/L	LEAD > 0.01 mg/L	NITRATE > 45 mg/L	SELENIUM > 0.01 mg/L	URANIUM > 20 ug/L	BAP >0.01 ug/L
GOODSOIL	98	6	95	72.75			1.87					
GRANDVIEW BEACH	62	13	31									
GRAVELBOURG	81	2	100	149.63								
GRAYSON	77	0	95									
GREENSTREET	100	0	92		27							
GREENWATER PROV. PARK	112	7	93	101.67								
GRIFFIN	285	8	31	5								
GRONLID	162	19	100	203								
GUERNSEY	90	13	100	228								
GULL LAKE	102	4	96	124.62			1.64					
HAGEN	77	25	96	127								
HALBRITE	108	11	100									
HANDEL	77	0	100									
HANLEY	88	2	98	30.34								
HARRIS	65	0	88									
HAZEL DELL	108	14	50									
HAZLET	100	12	86									
HERBERT	100	13	100	180.25								
HERSCHEL	85	18	0									
HITCHCOCK BAY	0	0	0									
HODGEVILLE	96	4	81									
HOEY	77	0	50									
HOLDFAST	88	4	54									
HOLIDAY ACRES WATER COOP	69	11	100									
HUBBARD	92	0	0									
HUDSON BAY	104	6	100	195								
HYAS	96	8	100								22	
ILE A LA CROSSE	102	2	95	188.34								
INSINGER	92	0	58							0.017	30	
INVERMAY	108	4	48									
JEDBURGH	77	0	70									
KANNATA VALLEY	100	15	56									
KAYVILLE	69	11	0								23	
KEELER	46	33	0									

COMMUNITY	Bact % Submitted	Bact % Positive	% Proper Chlorine	THM Annual Average (mg/L)	ARSENIC > 25 ug/L	BORON > 5.0 mg/L	FLUORIDE > 1.5 mg/L	LEAD > 0.01 mg/L	NITRATE > 45 mg/L	SELENIUM > 0.01 mg/L	URANIUM > 20 ug/L	BAP >0.01 ug/L
KENDAL	69	0	100									
KENOSEE LAKE	104	4	86									
KERROBERT	102	6	73	5.34								
KETCHEN	69	0	89									
KHEDIVE	85	0	0									
KINCAID	77	33	87	173.75								
KINDERSLEY	100	2	92	99.25			2.15					
KIPABISKAU REG.PK.	58	13	100									
KIPLING	100	4	100	192.34								
KRONAU	110	16	100	210.25								
KUROKI	98	6	93	188.75								
KYLE	100	0	69									
LAFLECHE	104	0	98	214								
LAIRD	83	5	98	59.5								
LAKE ALMA	177	0	4									
LANCER	100	0	62									
LANGBANK	77	0	100									
LANIGAN	102	0	89	156.5								
LAPORTE	23	100	0									
LASHBURN	102	4	100				1.6					
LEMBERG	100	8	86									
LEROSS	85	0	100									
LESLIE	77	20	92									
LIBERTY	102	2	96	491.34								
LIMERICK	92	2	94	106								
LINTLAW	96	4	88									
LIPTON	108	4	83									
LIVELONG	88	9	96									
LONE ROCK	77	0	100									
LOON LAKE	88	0	100									
LOREBURN	77	10	91									
LOVE	100	23	100									
LUMSDEN BEACH	38	0	0									
MACOUN	85	23	38									
MACRORIE	88	9	100									

COMMUNITY	Bact % Submitted	Bact % Positive	% Proper Chlorine	THM Annual Average (mg/L)	ARSENIC > 25 ug/L	BORON > 5.0 mg/L	FLUORIDE > 1.5 mg/L	LEAD > 0.01 mg/L	NITRATE > 45 mg/L	SELENIUM > 0.01 mg/L	URANIUM > 20 ug/L	BAP >0.01 ug/L
MAIDSTONE	71	5	62									
MANITOU BEACH	79	10	92									
MANKOTA	102	2	91	417								
MARENGO	115	0	0									
MARKINCH	77	0	36									
MARQUIS	90	4	41	64								
MARSHALL	96	12	98									
MAYFAIR	73	5	100	147								
MAYMONT	92	13	96									
MAZENOD	127	0	100	191.5								
MCLEAN	138	0	67									
MCTAGGART	100	2	0	153.5								
MEACHAM	92	0	0									
MEADOW LAKE	100	2	84	153.67			1.68					
MEETING LK. REG.PK.	65	6	81									
MELFORT RURAL PIPELINE	88	2	99									
MELFORT SWC	67	0	100									
MEOTA	6	33	100	413.5								
MICHEL VILLAGE	162	0	75	59								
MIDALE	121	0	100	175.25				0.012				
MIKADO	92	8	62	21								
MILDEN	98	0	56	17.5								
MILESTONE	196	1	74									
MINOWUKAW CAMPGD.	31	13	62	146								
MINTON	96	0	36									
MISSINIPE	63	3	53									
MISTATIM	23	42	86	56								
MOOSOMIN	104	9	95				1.845					
MORSE	104	11	100								22	
MORTLACH	108	4	69									
MOZART	100	0	85									
NEILBURG	83	0	91									
NEUDORF	100	0	0									
NICKLE L. REG.PK.	100	17	95	171								

COMMUNITY	Bact % Submitted	Bact % Positive	% Proper Chlorine	THM Annual Average (mg/L)	ARSENIC > 25 ug/L	BORON > 5.0 mg/L	FLUORIDE > 1.5 mg/L	LEAD > 0.01 mg/L	NITRATE > 45 mg/L	SELENIUM > 0.01 mg/L	URANIUM > 20 ug/L	BAP >0.01 ug/L
NIPAWIN	100	2	**88**									
NORQUAY	108	5	93									
NORTH BAY T.C.	**0**	0	**0**								**30**	
NORTH PORTAL	**23**	0	**0**									
NUT MOUNTAIN	165	9	**82**	**201.25**								
OKLA	**85**	9	**67**									
ORMISTON	92	**17**	100									
OSAGE	108	**36**	**83**	**178.5**								
OUTLOOK	**87**	4	98	70.34								
OXBOW	100	2	92	**134**								
PALMER	**23**	**50**	**50**	47								
PANGMAN	104	0	**52**									
PARRY	**85**	0	100									
PATHLOW	**62**	**50**	97									
PEEBLES	**77**	0	90									
PELICAN NARROWS	**8**	0	**0**									
PELLY	100	0	**38**									
PENZANCE	**85**	0	**0**									
PIAPOT	108	**29**	**50**									
PILGER	165	**21**	98	**163.5**								
PILOT BUTTE T.C.	**69**	0	**0**									
PLENTY	92	**25**	97									
PLUNKETT	100	8	**0**									
PONDEROSA T.C.	92	**17**	100									
PRAIRIE RIVER	100	4	100	**472**								
PREECEVILLE	123	3	**75**									
PRIMATE	**77**	10	**82**									
PRINCE ALBERT	123	2	96	34.86								
PRINCE ALBERT RURAL WATER	**63**	1	97									**0.02**
PRUD'HOMME	**73**	**11**	100									
PUNNICHY	**88**	0	96									
QU'APPELLE	110	0	**83**									
RABBIT LAKE	**88**	4	100									
RAMA	**38**	0	**60**	26.8								
READLYN	**8**	0	**0**									

COMMUNITY	Bact % Submitted	Bact % Positive	% Proper Chlorine	THM Annual Average (mg/L)	ARSENIC > 25 ug/L	BORON > 5.0 mg/L	FLUORIDE > 1.5 mg/L	LEAD > 0.01 mg/L	NITRATE > 45 mg/L	SELENIUM > 0.01 mg/L	URANIUM > 20 ug/L	BAP >0.01 ug/L
REGINA BEACH	98	2	71									
REGINA CORRECTIONAL	104	2	9									
REGINA N.IND.SUB.	112	3	66									
RHEIN	85	0	95								23	
RICETON	100	15	93									
RICHMOUND	100	12	0									
RIDGEDALE	106	22	100	238.5								
ROCHE PERCEE	81	5	100									
ROULEAU	108	14	100									
ROWANS RAVINE PROV.PK.	49	0	95									
RUSH LAKE	88	4	100	103			1.65					
SALVADOR	77	0	70									
SANDY BAY CAMPGD.	77	10	100									
SARNIA BEACH	19	20	50									
SASK. LANDING PROV.PK./NW	25	0	100									
SCOTT	88	9	77									
SCOUT LAKE	69	11	0									
SENLAC	69	33	92									
SHAMROCK	100	0	85									
SHELL LAKE	135	6	79									
SILTON	62	0	87									
SIMPSON	85	0	96									
SMILEY	92	33	31									
SOVEREIGN	77	20	88									
SPEERS	100	8	50									
SPRING VALLEY	188	12	14	57.75								
SPRUCE LAKE	100	0	98	142.5								
SPY HILL	88	0	78									
ST. VICTOR	123	44	4									
STANLEY MISSION	17	11	80	102.75								
STARLITE T.C.	85	0	36									
STEWART VALLEY	104	0	81									
STORTHOAKS	92	0	50									

COMMUNITY	Bact % Submitted	Bact % Positive	% Proper Chlorine	THM Annual Average (mg/L)	ARSENIC > 25 ug/L	BORON > 5.0 mg/L	FLUORIDE > 1.5 mg/L	LEAD > 0.01 mg/L	NITRATE > 45 mg/L	SELENIUM > 0.01 mg/L	URANIUM > 20 ug/L	BAP >0.01 ug/L
STRASBOURG	98	2	**29**									
STURGIS	96	6	**59**									
STWS-N SASKATOON	**68**	3	99									
STWS-W SASKATOON	**32**	0	94									
SUNNYSIDE COTT.OWN.	**27**	**14**	100	**232**								
SUNSET ESTATES T.C.	**42**	0	**0**									
SWAN PLAIN	**31**	**25**	100									
SWIFT CURRENT	103	1	100	**144.67**								
SYLVANIA	**77**	0	**60**									
TANTALLON	**81**	10	96									
THEODORE	104	0	**52**									
TIMBER BAY	**46**	**17**	**73**									
TISDALE	102	2	96				**1.68**					
TOGO	165	0	93								**22**	
TOMPKINS	108	4	**86**									
TORQUAY	146	**11**	**62**									
TRAMPING LAKE	**85**	0	**0**									
TROSSACHS	**73**	5	100	**199**								
TUFFNELL	**85**	9	**0**									
TURNOR LAKE	115	0	**88**									
UNITY	110	0	**82**									
URANIUM CITY	**88**	2	94	54.5								
VAWN	**77**	0	**80**									
VEREGIN	104	4	**7**	29								
VERWOOD	**69**	**56**	**67**									
VIBANK	100	8	100									
VICEROY	92	**25**	100	**312**							**26**	
VISCOUNT	92	4	100	**146**								
WADENA	192	4	95				**1.585**					
WAPITI VALLEY REG.PK.	**54**	0	100									
WASECA	94	2	100	**103**								

COMMUNITY	Bact % Submitted	Bact % Positive	% Proper Chlorine	THM Annual Average (mg/L)	ARSENIC > 25 ug/L	BORON > 5.0 mg/L	FLUORIDE > 1.5 mg/L	LEAD > 0.01 mg/L	NITRATE > 45 mg/L	SELENIUM > 0.01 mg/L	URANIUM > 20 ug/L	BAP >0.01 ug/L
WATSON	102	0	98				4.52					
WAWOTA	98	0	**61**									
WEBB	100	8	**50**									
WEEKES	**83**	9	100	**289.67**								
WEIRDALE	**77**	**40**	**83**									
WELWYN	**88**	0	**0**									
WEYAKWIN	196	6	**87**									
WEYBURN	121	1	100	**123.2**								
WHITE BEAR	104	**33**	97	43								
WHITE SPRUCE CENTRE	**62**	0	**87**									
WILKIE	102	0	**85**									
WILLOWBROOK	92	8	**44**									
WISHART	**85**	0	95									
WOLLASTON LAKE	**4**	0	100	33.5								
WOOD MOUNTAIN	**35**	**56**	**0**									
WOODROW	**42**	**27**	**0**	**217**								
WROXTON	92	**17**	**82**									
YARBO	96	0	100								**28**	
YELLOW CREEK	**85**	**27**	100									
YELLOW GRASS	102	**13**	92									
ZEALANDIA	**77**	10	**89**									
ZELMA	**85**	0	**18**									
ZENON PARK	**85**	0	91									

Appendix 2
Summary of PDWA and EBWO Details

Community	Date Added	Date Removed	PDWA	EBWO	LMT	Comments	Reason For Lifting
Antler	12/14/2000		1		yes	Lacks minimum water treatment processes.	
Avonlea	8/15/2002	8/17/2002	1		no	PDWA issued due to recent positive bacteriological sampling results.	
Barrier Water Group	1/25/2002		1		yes	SE regulated private system; doesn't meet minimum treatment standards. It is a groundwater source that is not chlorinated and the owners do not wish to chlorinate.	
Bear Creek	10/16/2000		1		yes	This northern settlement does not have chlorination equipment or any other treatment capability. This system is in questionable state and therefore a PDWA has been issued.	
Beaubier	12/14/2000		1		yes	Lacks minimum water treatment processes	
Benson	12/14/2000	2/4/2003	1		no	Lacks minimum water treatment processes	SE satisfied. Village's remedial action to optimize surface water pretreatment and filtration process is producing an acceptable level of turbidity
Black Point	10/16/2000		1		no		
Bracken	12/19/2002		1		no	PDWA issued due to high turbidity levels	
Brancepeth	1/31/2003	2/21/2003	1		no	Issued due to a significant deterioration of source water quality.	
Broderick	12/14/2000		1		yes	Lacks minimum water treatment processes.	.
Brooksby	12/14/2000		1		yes	Lacks minimum water treatment processes.	
Brownlee	10/7/2002	1/27/2003		1	no		

Community	Date Added	Date Removed	PDWA	EBWO	LMT	Comments	Reason For Lifting
Municipal Well - RM of Sasman #336							
Buchanan	6/14/2002	6/18/2002	1		no	PDWA issued - positive *E.Coli.* result found in routine bacteriological sample.	
Buffalo Narrows	11/29/2002	12/4/2002	1		no	PDWA issued due to the presence of *E.Coli.*	
Cadillac	9/11/2001		1		no	Issued due to extremely high turbidity levels - proper disinfection of treatment water cannot be confirmed.	
Candiac	11/20/2000		1		yes	Test results indicate presence of coliform.	
Carragana, Hamlet of (RM #395)	9/20/2002			1	no	Issued due to *E.Coli.* result.	
Ceylon	3/30/2003		1		no	Recent inspection indicated high turbidity; improper or inadequate filtration is probable cause.	
Cole Bay	9/16/2002		1		no	PDWA issued subsequent to a site visit of Sept. 16 and a positive bacteriological result from Sept. 10/2002.	
Colgate	2/26/2002		1		no	High turbidity in treated water.	
Congress	12/3/2001		1		yes	PDWA issued due to inadequacies in the Hamlet's water treatment system.	
Creelman	6/11/2002	11/18/2002	1		no	Issued due to high turbidity.	
Crooked River	12/14/2000		1		yes	Lacks minimum water treatment processes.	
Darsana Lodge & Public Eating Establishment	7/22/2002			1	yes	EBWO issued due to the presence of *E.Coli* and the lack of minimum treatment.	
Debden	9/30/2002	12/3/2002	1		no	PDWA issued due to excessive turbidity and malfunctioning treatment processes.	

Community	Date Added	Date Removed	PDWA	EBWO	LMT	Comments	Reason For Lifting
Demaine	12/5/2002	12/12/2002	1		no	PDWA issued due to concerns surrounding the presence of *E.Coli.* found in a routine water sample.	
Descharme Lake	10/16/2000		1		yes	This northern settlement does not have chlorination equipment or any other treatment capability. The system is in questionable state and therefore a PDWA was issued.	
Eastend	7/26/2002	7/30/2002		1	no	EBWO issued due to a positive *E.Coli.* result.	EBWO lifted by Swift Current Health District on July 30/02
Eldersley	12/14/2000		1		yes	Lacks minimum water treatment processes.	
Elfros	3/21/2002	5/27/2002	1		no	PDWA issued - village water supply ran dry.	
Erwood	12/14/2000		1		yes	Lacks minimum water treatment processes	
Fairy Glen	12/14/2000		1		yes	Lacks minimum water treatment processes.	
Flaxcombe	5/6/2002	7/22/2002	1		no	PDWA issued due to low bacteriological sample rate.	
Garson Lake	10/16/2000		1		yes	This northern settlement does not have chlorination equipment or any other treatment capability. The system is in questionable state and therefore a PDWA has been issued	
Gladmar	12/14/2000		1		yes	Lacks minimum water treatment processes	
Goodsoil	10/7/2002	10/11/2002		1	yes	EBWO issued due to positive *E.Coli.* result.	EBWO lifted - 2 sets of subsequent bacteriological samples have been found to be satisfactory; PDWA issued due to high turbidity and plant not meeting minimum treatment.

Community	Date Added	Date Removed	PDWA	EBWO	LMT	Comments	Reason For Lifting
Goodsoil	10/11/2002		1		yes	PDWA issued due to high turbidity and plant not meeting minimum treatment.	
Grandview Beach	7/30/2002	8/7/2002	1		no	PDWA issued due to recent positive bacteriological sample results.	
Greenwater Lake Prov. Park Campground & Subdivisions System	5/17/2002	5/22/2002	1		no	Due to the late spring start-up, potable water testing results have not yet been received from PL; therefore the safety of the campground's drinking water cannot be ensured at all times.	Five samples from the distribution system have come back negative
Greig Lake Campground	5/15/2002	6/7/2002	1		no	Due to the late spring start-up, potable water testing results have not been received from PL; therefore the safety of the campground's drinking water supply cannot be ensured at all times.	
Gronlid	12/14/2000		1		yes	Lacks minimum water treatment processes.	
Hazlet	7/26/2002	8/8/2002	1		no	PDWA issued due to recent positive bacteriological results.	
Herschel	12/14/2000		1		yes	Lacks minimum water treatment processes.	
Hillside Water Co-op	8/17/2001		1		yes	Insufficient bacteriological sample submission and no chlorination equipment at the water supply pumphouse.	
Kannata Valley	10/31/2000		1		no	Recent test results have shown an increased arsenic concentration in the well water; cause unknown. Not an immediate health concern; but does raise concerns with life time consumption of the water.	

Community	Date Added	Date Removed	PDWA	EBWO	LMT	Comments	Reason For Lifting
Keeler	11/19/2001		1		no	PDWA issued due to poor bacteriological submission and lack of chlorination.	
Kimball Lake Campground	5/15/2002	6/7/2002	1		no	Due to the late spring start-up potable water testing results have not yet been received from PL; therefore the safety of the campground's drinking water cannot be ensured at all times.	
Kincaid	12/27/2001	11/21/2002	1		no	PDWA issued due to poor bacteriological submission and lack of chlorination.	New groundwater WTP is up and running, line swabbing completed, super chlorination has been done and two sets of four bacteriological samples have come back negative.
La Loche	3/24/2003	3/27/2003	1		no	Dramatic increase in water usage has led to some low flow situations and as a result the main distribution systems are freezing up.	
Leader	5/25/2001		1		yes	Lacks minimum water treatment processes.	
Liberty	12/14/2000		1		no	Lacks minimum water treatment processes.	Liberty now meets minimum treatment requirements, however PDWA remains in place because of high turbidity.
Limerick	5/9/2002	7/19/2002	1		no	PDWA issued due to consistently high turbidities.	PDWA lifted - improvements made to water treatment plant and turbidities are within guidelines.

Community	Date Added	Date Removed	PDWA	EBWO	LMT	Comments	Reason For Lifting
Lower Fishing Lake Campground	5/17/2002 11:00 AM	5/17/2002 5:00 PM	1		no	Due to the late spring start-up potable water testing results have not yet been received from PL; therefore the safety of the campground's drinking water supply cannot be ensured at all times.	
Macoun	11/9/2002	2/4/2003		1	no	EBWO issued on November 9/02 due to two water samples indicating the present of *E.Coli.*	
Makwa	3/25/2003	3/31/2003	1		no	WTP had flooded included wet sump which pumps water to waste; presents a real potential for cross-contamination of the treated water supply with untreated water or potentially even wastewater.	
Manitou Beach	8/26/2002	9/5/2002	1		no	PDWA issued due to a repeat sample indicating an unacceptable level of contamination.	PDWA lifted - two sets of subsequent bacteriological samples have been found to be satisfactory.
Maple Creek	4/25/2002		1		no	PDWA issued until further investigation is done to ensure the integrity and safety of their water system.	
Maple Creek	4/18/2002	4/25/2002		1	no	EBWO issued - sample collected by PHI showed presence of *E.Coli.*	EBWO lifted as there are no immediate threat to the water system. PDWA issued until further investigation is done to ensure the integrity and safety of the water system.
Mayfair	8/14/2002	11/6/2002	1		no	PDWA issued until bacteriological safety of new water supply can be determined.	

Community	Date Added	Date Removed	PDWA	EBWO	LMT	Comments	Reason For Lifting
Mazenod	1/2/2002	7/22/2002	1		no	PDWA issued due to the lack of coagulant used in their surface water treatment plant. They also do not monitor turbidity levels.	Community is now using a coagulant and is monitoring turbidity levels daily.
Meeting Lake Regional Park.	4/17/2002	12/27/2002	1		no	PDWA issued due to high turbidity - problems with filters.	
Meota	6/12/2001		1		no	PDWA issued - resamples have come back positive - high turbidity.	
Michel Village	7/4/2001	4/12/2002	1		no	Recent bacteriological results along with low chlorine levels indicate the water may be contaminated and the water treatment process may be inadequate to ensure continuous safe drinking water to users.	PDWA lifted - there were no positive bacteriological results since Nov. 19/01; turbidity levels are below 1 NTU; free chlorine levels have been consistently above 0.1 mg/L.
Michel Village	7/7/2001	4/12/2002		1	no	EBWO issued due to positive *E.Coli.* result.	EBWO lifted - there were no positive bacteriological since Nov. 19/01; turbidity levels are below 1 NTU; free chlorine levels have been consistently above 0.1 mg/L.
Michel Village	10/3/2002	1/23/2003	1		no	PDWA issued subsequent to chlorinator malfunction.	The chlorinator has been fixed.
Michel Village	2/11/2003		1		no	PDWA issued subsequent to WTP malfunction of Feb. 10/ 03.	
Mikado	9/18/2000	4/25/2002	1		no		PDWA lifted - site inspections followed by favourable test results indicate that the Hamlet now provides safe drinking water.
Minowuka Campground	5/17/2002		1		no	Due to the late spring start-up potable water testing results have not been received from PL; therefore the safety of the campground's drinking water supply cannot be ensured at all times.	

Community	Date Added	Date Removed	PDWA	EBWO	LMT	Comments	Reason For Lifting
Mistatim	12/14/2000		1		yes	Lacks minimum water treatment processes.	
Moose Horn Lodge (Little Bear L) (Cabins 10 & 11-Mile 62)	8/2/2002			1	no	Issued due to *E.Coli.* result.	
Narrow Hills Provincial Park - Lower Fishing Lake	5/17/2002		1		no	Issued due to the late spring startup potable water testing results have not yet been received from PL; therefore the safety of the Campground's drinking water supply cannot be ensured at all times.	
Nemeiben Lake Campground in Lac La Ronge Provincial Park	5/16/2002	10/25/2002	1		no	Due to the last spring start-up potable water testing have not yet been received from PL; therefore the safety of the campground's drinking water supply cannot be ensured at all times.	Water system has been shut down for the season
Nut Mountain	6/28/2002	7/10/2002		1	no	EBWO issued due to a positive *E.Coli.* result.	
Nut Point Campground	5/31/2002	10/25/2002	1		no	Issued due to the late season start-up, bacteriological sample results have not been received to ensure the safety of the potable water supplied to the campground	Water system has been shut down for the season
Osage	3/14/2002		1		yes	No coagulation/flocculation front end treatment for surface water treatment plant.	
Palmer	5/6/2002		1		no	PDWA issued due to low bacteriological sample rate.	
Pathlow	9/20/2002	4/10/2003	1		no	PDWA issued due to a series of poor bacteriological results.	

Community	Date Added	Date Removed	PDWA	EBWO	LMT	Comments	Reason For Lifting
Pawistik Lodge (Hanson Lake Road-Km 271)	6/4/2002		1		yes	EBWO issued - lacks minimum treatment	
Paynton	4/16/2002	5/28/2002		1	no	EBWO issued due to the presence of *E.Coli.* in one water sample result.	
Penzance	12/14/2000	9/18/2002	1		no	Lacks minimum water treatment processes.	SE is satisfied with the recent installation of chlorination equipment and continuous chlorination has resumed.
Prairie River	12/14/2000		1		yes	Lacks minimum water treatment processes	
Radville	3/14/2002	6/10/2002	1		no	High turbidity in treated water.	Remedial action to optimize the surface water pretreatment process is producing an acceptable level of turbidity (less than 0.5 NTU).
Rama	12/14/2000	4/25/2002	1		no	Lacks minimum water treatment processes.	PDWA lifted as a result of the community installing and recently commissioning a pipeline from Canora's treated water supply.
Readlyn	12/14/2000		1		yes	Lacks minimum water treatment processes.	
Ridgedale	12/14/2000		1		yes	Lacks minimum water treatment processes	
Sandy Bay	6/28/2002	3/25/2003	1		no	High total coliform count in drinking water sample.	PDWA lifted on March 25/03
Sandy Bay	7/26/2002	3/27/2003		1	no	EBWO issued due to recent positive bacteriological results.	
Semans	3/31/2003		1		no	Issued during the switching over from groundwater to the surface water source.	

Community	Date Added	Date Removed	PDWA	EBWO	LMT	Comments	Reason For Lifting
Shell Lake	5/8/2002		1		yes	PDWA issued due to inadequate water treatment capabilities and the safety of the Shell Lake drinking water supply cannot be ensured at all times.	
Sled Lake	9/5/2000		1		no	This PDWA issued by SH in relation to their old water system.	
Sovereign	7/16/2002	8/1/2002		1	no	EBWO issued because of a positive *E.Coli.* result.	
Spalding Grid West Well House	6/10/2002		1		no		
Spalding Grid West Well House	11/12/2002			1	no	EBWO issued due to positive *E.Coli.* result	
Spruce Lake	5/9/2001		1		no	An increase in turbidity, along with recent water tests submitted indicate the water may be contaminated and the water treatment process may be inadequate to ensure continuous safe drinking water.	
St. Victor	12/14/2000		1		yes	Lacks minimum water treatment processes.	
Star City	11/28/2002	12/2/2002		1	no	EBWO issued due to the presence of *E.Coli*	
Stony Rapids	5/23/2002	6/20/2002	1		no	High turbidity in treated water.	Turbidity measurements have been within recommended guidelines.
Stony Rapids	9/23/2002	9/27/2002	1		no	PDWA issued due to excessive turbidity.	PDWA lifted - two sets of subsequent bacteriological samples have been found to be satisfactory.
Stony Rapids	10/23/2002	10/31/2002		1	no	EBWO issued due to the presence of *E.Coli.* bacteria in the old public water supply.	EBWO rescinded for old water supply. Consecutive repeat samples returned with acceptable microbiological quality.

Community	Date Added	Date Removed	PDWA	EBWO	LMT	Comments	Reason For Lifting
Sunnyside Cottage Owners	7/10/2001		1		yes	Lacks minimum water treatment processes.	
Sunnyside Resort	7/11/2001			1	yes	This water source is untreated and used by a small group of recreational trailers. This site is not licensed by SE and the EBWO was issued by SH due to a positive bacteriological result.	
Timber Bay	9/20/2002	10/25/2002	1		no	PDWA issued - chlorination is down; frequent depressurization in distribution system due to other water plant operational difficulties.	PDWA upgrade to EBWO due to positive fecal coliform result.
Timber Bay	10/25/2002			1	no	EBWO issued due to positive fecal coliform result.	
Tourist Camp/Cpgd-NW corner Canoe Lake-Hwy 903, 20 km from Cole Bay	7/9/2002			1	no	EBWO issued when a repeat sample submitted to the PL on July 3 was found to contain *E.Coli.* bacteria.	
Trossachs	3/14/2002		1		yes	No coagulation/flocculation front end treatment for surface water treatment plant.	
Turnor Lake	5/7/2002	10/11/2002	1		no	On April 24/2002 Birch Hills Narrows Dene Nation & the Northern Hamlet of Turnor Lake place a voluntary PDWA on the waterworks in response to unthawing of a frozen water main. This was issued as a formal PDWA on May 28/02.	PDWA lifted - water treatment plant upgrades have been completed.
Uranium City	5/30/2001		1		yes	Lacks minimum water treatment processes.	

Community	Date Added	Date Removed	PDWA	EBWO	LMT	Comments	Reason For Lifting
Verwood	3/21/2002		1		yes	Treatment does not include continuous chlorination.	
Wadin Bay Campground & Cottage Owners	5/31/2002	10/25/2002	1		no	Issued due to the late season start-up; bacteriological sample results have not been received to ensure the safety of the potable water supplied to the campground.	Water system has been shut down for the season.
Weekes	3/6/2003		1		no	During recent inspection it was noted that the quality of source water in dugout has significantly deteriorated since previous inspection; causing turbidity levels in the water entering dist. system to be above acceptable levels.	
White Bear	3/24/2003		1		no	Issued due to high turbidity in the treated water (20 NTU)	
Wood Mountain	12/14/2000		1		yes	Lacks minimum water treatment processes.	

Appendix 3
Summary of Communities with Certified Operators, System Classification and Operator Classification

Community Facility Effective May 5, 2003	Certified Operator	Water Plant Classification	Operator Certified as:	Distribution System Classification	Operator Certified as:	Wastewater Facility Classi fication	Operator Certified as:	Collection System Classification	Operator Certified as:
Air Ronge	Ellison, G.E.	WT2	WT2	WD1	WD2	WWT1	WWT1	WWC1	WWC1
Air Ronge	Lueke, D.G.	WT2	WT2	WD1	WD2	WWT1	WWT1	WWC1	WWC1
Allan	Garman J.	N/A		WD1	WD1	WWT1		WWC1	
Alvena	Matheson D.G.	WT1	WT1	WD1	WD1	WWT1		WWC1	
Anglin & Emma Lake Rec Site	Herzog, CC	WT1	WT1	N/A	WD1	N/A		N/A	
Anglin & Emma Lake Rec Site	Loftus, KN	WT1	WT1	N/A	WD1	N/A		N/A	
Archerwill	Christianson L.C.	WT1	WT1	WD1	WD1	WWT1	WWT1	WWC1	WWC1
Assiniboia	Kordus, P.	WT3	WT3	WD2	WD2	WWT1		WWC2	WWC2
Avonlea	Granger, M.	WT2	WT2	WD1	WD1	WWT1	WWT1	WWC1	WWC1
Balcarres	Hoffart, G.P.	WT1	WT1	WD1	WD1	WWT1	WWT1	WWC1	WWC1
Balcarres	Smith J.G.	WT1	WT1	WD1	WD1	WWT1	WWT1	WWC1	WWC1
Battleford	Chaykowski, K.N.	WT2	WT2	WD2	WD2	WWT1	WWT1	WWC2	WWC2
Battleford	Chmelnyk R.G.	WT2	WT2	WD2	WD2	WWT1	WWT1	WWC2	WWC2
Battleford	Peters, Don_R.	WT2	WT2	WD2	WD1	WWT1		WWC2	
Battlefords Provincial Park	Bauer, R.	WT1	WT1	WD1	WD1	WWT1		WWC1	
Battlefords Provincial Park	Nichol, V.	WT1	WT1	WD1	WD1	WWT1		WWC1	
Beauval	Morin, M.	WT1	WT1	WD1	WD1	WWT1	WWT1	WWC1	WWC1
Bengough	Nergard, K.S.	WT1	WT1	WD1	WD1	WWT1	WWT1	WWC1	WWC1
Big River	Warriner, R.	WT2	WT2	WD1	WD2	WWT1	WWT1	WWC1	WWC1
Biggar	Borne, R.P.	WT2	WT2	WD2		WWT3	WWT2	WWC2	
Birch Hills	Manson, HR.	WT2	WT1	WD1	WD1	WWT1	WWT1	WWC1	WWC1
Birch Hills	Shore, R.L.	WT2	WT1	WD1	WD1	WWT1	WWT1	WWC1	WWC1
Borden	Thiessen, P.J.	WT1	WT1	WD1	WD1	WWT1	WWT1	WWC1	WWC1
Buffalo Narrows	Petit, M.L.	WT2	WT2	WD1	WD2	WWT1	WWT1	WWC1	WWC1
Buffalo Pound Filtration Plant	Berezowski, E.	WT4	WT4	N/A		N/A		N/A	
Buffalo Pound Filtration Plant	Boots, B.	WT4	WT4	N/A		N/A		N/A	
Buffalo Pound Filtration Plant	Chorney, J.	WT4	WT1	N/A		N/A		N/A	

Community Facility Effective May 5, 2003	Certified Operator	Water Plant Classification	Operator Certified as:	Distribution System Classification	Operator Certified as:	Wastewater Facility Classi fication	Operator Certified as:	Collection System Classification	Operator Certified as:
Buffalo Pound Filtration Plant	Drake, S.	WT4	WT3	N/A		N/A		N/A	
Buffalo Pound Filtration Plant	Friesen, Brian	WT4	WT3	N/A		N/A		N/A	
Buffalo Pound Filtration Plant	Gullage, E.	WT4	WT4	N/A		N/A		N/A	
Buffalo Pound Filtration Plant	Hanning N.	WT4	WT2	N/A		N/A		N/A	
Buffalo Pound Filtration Plant	Hoppenreys, B.	WT4	WT3	N/A		N/A		N/A	
Buffalo Pound Filtration Plant	Johnson Keith	WT4	WT1	N/A		N/A		N/A	
Buffalo Pound Filtration Plant	Meili, S.	WT4	WT3	N/A		N/A		N/A	
Buffalo Pound Filtration Plant	Merifield P.	WT4	WT2	N/A		N/A		N/A	
Buffalo Pound Filtration Plant	Miller, R. H.	WT4	WT3	N/A		N/A		N/A	
Buffalo Pound Filtration Plant	Schurko D.	WT4	WT1	N/A		N/A		N/A	
Buffalo Pound Filtration Plant	Smith, D.	WT4	WT2	N/A		N/A		N/A	
Buffalo Pound Filtration Plant	Sutherland, J.	WT4	WT4	N/A		N/A		N/A	
Buffalo Pound Filtration Plant	Zinn, L.	WT4	WT2	N/A		N/A		N/A	
Burstall	Bodnarchuk, B.J.	WT1	WT1	WD1	WD1	WWT1		WWC1	
Cabri	Dahl, P.O.	WT2	WT1	WD1	WD1	WWT1	WWT2	WWC1	WWC1
Candle Lake/Sandy Bay/Minowuka	Sachkowski, M.	WT1	WT1	N/A	WD1	N/A		N/A	
Canora	Wasyliw D.	WT3	WT2	WD2	WD1	WWT1		WWC2	
Canwood	Lovberg, L.	WT1	WT1	WD1	WD1	WWT1		WWC1	
Carievale	Hanson, L.	WT1	WT1	WD1	WD1	WWT1		WWC1	
Carrot River	Sisson, T.	WT1	WT1	WD1	WD1	WWT1		WWC1	
Ceylon	Gust, N.L.	WT2	WT1	WD1		WWT1		WWC1	
Chaplin	Polley K.	WT1	WT2	WD1	WD2	WWT1	WWT1	WWC1	WWC1
Chitek Lake Recreation Site	Booker LE	WT1	WT1	N/A	WD1	N/A		N/A	
Choiceland	Stuefloten, JJ.	WT1	WT1	WD1	WD1	WWT1	WWT1	WWC1	WWC1
Christopher Lake	Anderson, E K	N/A	WT1	N/A	WD1	WWT1		WWC1	
Christopher Lake	Gee, B.	N/A	WT1	N/A	WD1	WWT1		WWC1	
Cochin	Elder L.	WT1		WD1	WD1	WWT1			
Coleville	Gartner RB.	WT1	WT1	WD1	WD1	WWT1	WWT1	WWC1	WWC1
Colonsay	Babyck R.	WT2	WT2	WD1	WD1	WWT1	WWT1	WWC1	WWC1
Coronach	Wilson, Robert WM	WT1	WT1	WD1	WD1	WWT1	WWT1	WWC1	WWC1
Creighton	Blackmon, K.J.	WT2	WT1	WD2	WD1	WWT2	WWT1	WWC2	WWC1

Community Facility Effective May 5, 2003	Certified Operator	Water Plant Classification	Operator Certified as:	Distribution System Classification	Operator Certified as:	Wastewater Facility Classi fication	Operator Certified as:	Collection System Classification	Operator Certified as:
Creighton	Brown B.	WT2	WT2	WD2	WD2	WWT2	WWT1	WWC2	WWC1
Creighton	Patience W.	WT2	WT1	WD2	WD1	WWT2	WWT1	WWC2	
Crooked Lake Provincial Park	Reiss, RD.	WT1	WT1	WD1	WD1	N/A		N/A	
Crystal Lake Resort	Skomorowski, Linda	WT1	WT1	WD1	WD1	N/A		N/A	
Crystal Springs	Hanson, G. Ray	WT1	WT1	WD1	WD1	WWT1		WWC1	
Cumberland House	Deschambeault, C.	WT2	WT2	WD1	WD2	WWT1	WWT1	WWC1	WWC1
Cupar	Nameth, A.	WT2	WT1	WD1	WD1	WWT1	WWT1	WWC1	WWC1
Cypress Hills Provincial Park	Foraie, M.	WT1	WT1	WD1	WD2	WWT2		WWC1	
Dalmeny	Bates L.	N/A		WD2	WD1	WWT1	WWT1	WWC2	WWC1
Danielson Provincial Park/Main	Eddy, R.	WT1	WT1	N/A	WD1	WWT1		N/A	
Davidson	Percy, J.	WT2	WT2	WD1		WWT1	WWT1	WWC1	
Debden	Beaulac P.	WT2	WT1	WD1	WD1	WWT1		WWC1	
Denare Beach	Brooks, B.A.	WT1	WT1	WD1	WD1	WWT2		WWC1	WWC1
Dodsland	Webber R.W.	WT1	WT1	WD1	WD1	WWT1	WWT1	WWC1	WWC1
Dorintosh	Raketti, D.	WT1	WT1	WD1	WD1	WWT1		WWC1	
Douglas Provincial Park	Krogan, C.L.	WT1	WT1	N/A	WD1	WWT1		N/A	
Douglas Provincial Park	Fiske K.J.	WT1	WT1	N/A	WD1	WWT1	WWT1	N/A	WWC1
Douglas Provincial Park	Perry JW	WT1	WT1	N/A	WD1	WWT1		N/A	
Drake	Kiefer R.	WT1	WT1	WD1	WD1	WWT1		WWC1	
Duck Lake	Gehon, D.	WT1	WT1	WD1	WD1	WWT1	WWT1	WWC1	WWC1
Duck Mountain Provincial Park	Schiefner, L.	WT1	WT1	WD1	WD1	WWT1		N/A	
Duck Mountain Provincial Park	Currie, G.	WT1	WT1	WD1	WD1	WWT1		N/A	
Duck Mountain Provincial Park	Thompson, K.W.	WT1	WT1	WD1	WD1	WWT1		N/A	
Duck Mountain Provincial Park	Wyber, D.L.	WT1	WT1	WD1	WD1	WWT1		N/A	
Dysart	Grohs, Q.J.	WT1	WT1	WD1	WD1	WWT1		WWC1	
Eatonia	Miller, R.	WT1	WT1	WD1	WD1	WWT1	WWT1	WWC1	WWC1
Echo Valley Provincial Park	Rumancik, Paul A.	WT1	WT1	WD1	WD1	WWT1	WWT1	WWC1	WWC1
Echo Valley Provincial Park	Senft, D.	WT1	WT1	WD1	WD1	WWT1	WWT1	WWC1	WWC1
Elk Ridge Resort	Gossen, D. A.	WT1	WT1	N/R	WD1	N/R		N/R	
Englefeld	Zimmerman, R.	WT1	WT1	WD1	WD1	WWT1	WWT1	WWC1	WWC1
Esterhazy	Hozjan R.C.	WT2	WT2	WD2	WD1	WWT1		WWC2	WWC1

Community Facility Effective May 5, 2003	Certified Operator	Water Plant Classification	Operator Certified as:	Distribution System Classification	Operator Certified as:	Wastewater Facility Classi fication	Operator Certified as:	Collection System Classification	Operator Certified as:
Estevan	Baker, Wm.	WT3	WT3	WD2		WWT3	WWT3	WWC2	
Estevan	Fox, S.B.	WT3		WD2	WD2	WWT3		WWC2	WWC2
Estevan	Milford, C.H.	WT3		WD2		WWT3		WWC2	WWC1
Estevan	Naka, L.	WT3		WD2	WD1	WWT3		WWC2	WWC1
Estevan	Schmidt, V.D.	WT3		WD2	WD1	WWT3		WWC2	WWC1
Estevan	Sutter, K.J.	WT3	WT3	WD2	WD2	WWT3	WWT3	WWC2	
Estevan	Velestuk T.	WT3	WT3	WD2		WWT3	WWT1	WWC2	
Eston	Meyer J.	WT2	WT2	WD1	WD1	WWT1	WWT1	WWC1	WWC1
Etters Beach	Wolff, G.J.	WT1	WT1		WD1	N/A		N/A	
Fort Qu'Appelle	Braithwaite, K.	WT2	WT2	WD2	WD2	WWT2		WWC2	
Fort Qu'Appelle	Giroux, B.D.	WT2	WT2	WD2	WD2	WWT2		WWC2	WWC2
Gerald	Jepson, R.	WT1	WT1	WD1	WD1	WWT1		WWC1	
Glaslyn	Pylypow, C.	WT2	WT1	WD1	WD1	WWT1		WWC1	
Good Spirit Provincial Park	Bigoraj, M.	WT1	WT1	N/A	WD1	WWT1		N/A	
Goodsoil	Weber J.	WT1	WT1	WD1	WD1	WWT1		WWC1	
Govan	Hilderman, K.A.	WT1	WT1	WD1	WD1	WWT1	WWT1	WWC1	WWC1
Grand Coulee	Pratt, J.	N/A		WD1	WD1	WWT1		WWC1	
Gray	Dierker G.J.	WT1	WT1	WD1	WD1	WWT1	WWT1	WWC1	
Green Lake	Morin, K.H.	WT1	WT1	WD1	WD1	WWT1	WWT1	WWC1	WWC1
Gull Lake	Busse A.J.	WT3	WT2	WD1	WD1	WWT1		WWC1	
Halbrite	Evans, Ron_W	WT2	WT1	WD1	WD1	WWT1		WWC1	
Herbert	Gerl, D.	WT2	WT2	WD1	WD1	WWT1		WWC1	WWC1
Hudson Bay	Drebit, L.	WT2	WT2	WD2	WD2	WWT1	WWT1	WWC2	WWC2
Hudson Bay	Morin, E.S.	WT2	WT1	WD2	WD1	WWT1	WWT1	WWC2	WWC1
Hudson Bay	Paulson, M.	WT2		WD2	WD2	WWT1		WWC2	WWC2
Hudson Bay	Tchorzewski, W.	WT2	WT2	WD2	WD2	WWT1	WWT1	WWC2	WWC2
Humboldt	Lukan, K.	N/A	WT2	WD2	WD2	WWT2	WWT2	WWC2	WWC2
Humboldt	Schlitz, T.A.	N/A		WD2	WD1	WWT2		WWC2	WWC2
Ile a la Crosse	Dubrule, L.W.	WT2	WT2	WD1	WD2	WWT1	WWT1	WWC1	WWC1
IMC Kalium	Ackerman K.	WT2	WT2	N/R		N/R		N/R	
IMC Kalium	Hinz G.J.	WT2	WT2	N/R		N/R		N/R	

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IMC Kalium	Twa, Robert_J.	WT2	WT2	N/R		N/R		N/R	
Imperial	Klenk, K.	WT1	WT1	WD1	WD1	WWT1	WWT1	WWC1	WWC1
Indian Head	Krecsy, M.	WT2	WT2	WD2	WD2	WWT1		WWC2	WWC2
Indian Head	Schreiner, C.	WT2	WT2	WD2	WD2	WWT1	WWT1	WWC2	WWC1
Ituna	Salynuik, M	WT2	WT1	WD1	WD1	WWT1	WWT1	WWC1	WWC1
Jan, Bernard & Amis Lakes	Santo, A	WT1	WT1	WD1	WD1	WWT1		WWC1	WWC1
Kamsack	Bolduc, B.P.	WT3	WT1	WD2	WD2	WWT1	WWT1	WWC2	WWC2
Kamsack	Wishnevetski D.	WT3	WT2	WD2		WWT1		WWC2	
Kelliher	Evans R.	WT1	WT1	WD1	WD1	WWT1	WWT1	WWC1	WWC1
Kelvington	Hope R.	WT1	WT1	WD1	WD1	WWT1	WWT1	WWC1	WWC1
Kenaston	Stacowich, Joseph	WT1	WT1	WD1	WD1	WWT1	WWT1	WWC1	WWC1
Kindersley	Reinhart, L.D.	WT3	WT3	WD2	WD2	WWT1		WWC2	
Kyle	Smith, R.W.	N/A		WD1	WD1	WWT1	WWT1	WWC1	WWC1
La Loche	Roth, K.	WT1	WT1	WD1	WD1	WWT1		WWC2	WWC1
La Ronge	McPhee, D.	WT2	WT2	WD2	WD2	WWT2	WWT2	WWC2	WWC2
La Ronge	Wasylenchuk, N.R.	WT2	WT2	WD2	WD2	WWT2	WWT1	WWC2	WWC1
Lac La Ronge Provincial Park	Marchinko, S.A.	WT1	WT1	WD1	WD1	WWT1		N/A	
Lampman	Miller Jason	WT1	WT1	WD1	WD1	WWT1		WWC1	
Langenburg	Van Caeseele K.	WT2		WD1	WD2	WWT1		WWC1	WWC1
Langham	Sawatzky, L.	WT1	WT1	WD1	WD1	WWT1	WWT1	WWC1	WWC1
Lanigan	Crowley, B.M.	WT2	WT2	WD1	WD2	WWT1	WWT1	WWC1	WWC1
Lanigan	Czemeres T.	WT2	WT2	WD1	WD1	WWT1	WWT1	WWC1	WWC1
Lashburn	Rokosh G.	WT2	WT1	WD1	WD1	WWT1	WWT1	WWC1	WWC1
Leader	Herman, K.W.	WT1	WT1	WD1	WD1	WWT1	WWT1	WWC1	WWC1
Leader	Seifert T.	WT1	WT1	WD1	WD1	WWT1	WWT1	WWC1	WWC1
Lemberg	Senft G.	WT1	WT1	WD1	WD1	WWT1	WWT1	WWC1	WWC1
Leroy	Taphorn, L.	WT1	WT1	WD1	WD1	WWT1	WWT1	WWC1	WWC1
Lipton	Senft A. L.	WT1	WT1	WD1	WD1	WWT1	WWT1	WWC1	WWC1
Loon Lake	Tracey J.	WT2	WT1	WD1	WD1	WWT1		WWC1	
Lumsden	Schulz R.	N/A	WT2	WD1	WD1	WWT1	WWT1	WWC1	WWC1
Luseland	Olfert B.H.	WT1	WT1	WD1	WD1	WWT1		WWC1	WWC1

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Macklin	Bolton, N.J.	N/A	WT1	WD1	WD1	WWT1		WWC1	WWC1
Macklin	Gerling Wm.	N/A		WD1	WD1	WWT1		WWC1	
Macklin	Legge G.E.	N/A		WD1	WD1	WWT1		WWC1	
Maidstone	Anderson, J.	WT1	WT2	WD1	WD2	WWT1	WWT1	WWC1	WWC1
Maidstone	Sewell, SR	WT1	WT1	WD1	WD1	WWT1		WWC1	
Mankota	Hiltz H.	WT2	WT1	WD1	WD1	WWT1		WWC1	
Maple Creek	Hancock, J.	WT1	WT1	WD2	WD1	WWT1	WWT1	WWC2	WWC1
Maple Creek	Jebson R.	WT1	WT2	WD2	WD2	WWT1	WWT1	WWC2	WWC1
Marcelin	Clouthier, G.J.	WT1	WT1	WD1	WD1	WWT1		WWC1	
Martensville	Friesen, Wm.	N/A		WD2	WD2	WWT1	WWT1	WWC2	WWC2
Martensville	Hamm, E.J.	N/A		WD2	WD2	WWT1	WWT1	WWC2	WWC2
Meadow Lake	Crossman, RD.	WT2	WT2	WD2	WD2	WWT1	WWT1	WWC2	WWC2
Meadow Lake	Sergent, P.	WT2	WT2	WD2	WD2	WWT1	WWT1	WWC2	WWC2
Meadow Lake Provincial Park	Getzinger, VA	WT1	WT1	N/A	WD1	WWT1		N/A	
Meadow Lake Provincial Park	Dallyn C.	WT1	WT1	N/A	WD1	WWT1		N/A	
Meadow Lake Provincial Park	Schwartz, E.	WT1	WT1	N/A	WD1	WWT1	WWT1	N/A	WWC1
Medstead	Watson R.	WT1	WT1	WD1	WD1	WWT1	WWT1	WWC1	WWC1
Melfort	Gilmore, G.J.	N/A		WD2	WD1	WWT1		WWC2	WWC1
Melville	Bell, D.K.	WT4	WT3	WD2		WWT2		WWC2	
Melville	Heshka D.	WT4	WT4	WD2	WD2	WWT2	WWT2	WWC2	WWC2
Melville	Stokal, G.	WT4	WT2	WD2		WWT2		WWC2	
Moose Jaw	Coates O.	N/A		WD3	WD3	WWT2	WWT2	WWC3	WWC3
Moose Jaw	Harder B.	N/A		WD3	WD2	WWT2	WWT2	WWC3	WWC2
Moose Jaw	Williams G.	N/A		WD3	WD2	WWT2		WWC3	WWC2
Mossbank	Rollie, R.	N/A		WD1	WD1	WWT1	WWT1	WWC1	WWC1
Muenster	Korte G.	N/A		WD1	WD1	WWT1	WWT1	WWC1	WWC1
Murray Point Campground	Locke, G.A.	N/A	WT1	N/A	WD1	N/A		N/A	
Naicam	LaPorte, M.R.	WT2	WT1	WD1	WD1	WWT1		WWC1	
Naicam	Peterson, Ken	WT2	WT1	WD1	WD1	WWT1	WWT1	WWC1	WWC1
Narrow Hills Provincial Park	Laliberte, R.G.	WT1	WT1	N/A	WD1	WWT1		N/A	
Narrow Hills Provincial Park	Nelson, GK	WT1	WT1	N/A	WD1	WWT1		N/A	

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Neilburg	Ball, M.A.	WT2	WT1	WD1	WD1	WWT1	WWT1	WWC1	WWC1
Nipawin	Aasen, D.	WT2	WT2	WD2	WD2	WWT1	WWT1	WWC2	WWC2
Nipawin	Enns, J.	WT2	WT2	WD2	WD2	WWT1	WWT1	WWC2	WWC2
Nokomis	Wood J.C.	N/A		WD1	WD1	WWT1	WWT1	WWC1	WWC1
Norquay	Howard G.	WT1	WT1	WD1	WD1	WWT1	WWT1	WWC1	WWC1
North Battleford	Allen P.R.	WT3	WT3	WD2		WWT3	WWT3	WWC2	
North Battleford	Bajak J.	WT3		WD2	WD2	WWT3		WWC2	WWC2
North Battleford	Carriere, C.	WT3		WD2	WD2	WWT3		WWC2	WWC2
North Battleford	Dyck, C.D.	WT3	WT3	WD2		WWT3		WWC2	
North Battleford	Hollmann, F.	WT3	WT3	WD2		WWT3		WWC2	
North Battleford	Honch, R.M.	WT3		WD2	WD2	WWT3		WWC2	WWC1
North Battleford	Kozlowski, L.	WT3		WD2	WD2	WWT3		WWC2	WWC2
North Battleford	Sack, C.	WT3		WD2	WD1	WWT3		WWC2	WWC1
North Battleford	Serool L.	WT3	WT3	WD2		WWT3		WWC2	
North Battleford	Szuch, Judy	WT3	WT1	WD2		WWT3	WWT1	WWC2	
Odessa	Hoffart M.	WT1	WT1	WD1	WD1	WWT1	WWT1	WWC1	WWC1
Ogema	Schwindt, B.P.	WT1	WT1	WD1	WD1	WWT1		WWC1	WWC1
Outlook	Clark, C.	WT2	WT2	WD2	WD2	WWT1	WWT1	WWC2	WWC2
Outlook	Pederson, R.	WT2	WT2	WD2	WD2	WWT1	WWT1	WWC2	WWC2
Outlook West Pipeline	Fontaine, A.A.	WT2	WT1	WD1	WD1	N/A		N/A	
Oxbow	Biberdorf M.	WT1	WT1	WD1	WD1	WWT1		WWC1	
Oxbow	Dalziel T.	WT1	WT1	WD1	WD1	WWT1		WWC1	
Oxbow	Gies, Curt E	WT1	WT1	WD1	WD1	WWT1		WWC1	
PCS Lanigan	Clavelle, T.J.	WT2	WT1	WD1	WD1	N/R		N/R	
PCS Lanigan	Hall, K.W.	WT2	WT2	WD1	WD2	N/R		N/R	
PCS Lanigan	Hyra, W.A.	WT2	WT1	WD1	WD1	N/R		N/R	
PCS Lanigan	Siermachesky, O.L.	WT2	WT1	WD1	WD1	N/R		N/R	
PCS Lanigan	Tempel, R.F.	WT2	WT1	WD1	WD1	N/R		N/R	
PCS Lanigan	Zehner, D.C.	WT2	WT1	WD1	WD1	N/R		N/R	
Pelly	Gulka, J.	WT1	WT1	WD1	WD1	WWT1	WWT1	WWC1	WWC1
Pennant	Croteau, J.	WT1	WT1	WD1	WD1	WWT1	WWT1	WWC1	WWC1

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Pense	Sieben, D.R.	N/A		WD1	WD1	WWT1		WWC1	
Pinehouse Lake	Georges, R.K.	WT2	WT2	WD1	WD2	WWT1	WWT1	WWC1	WWC1
Ponteix	Emms, C.L.	WT2	WT1	WD1	WD1	WWT1		WWC1	WWC1
Ponteix	Panko, R.M.	WT2	WT2	WD1		WWT1	WWT1	WWC1	WWC1
Preeceville	Pillipow D.	WT1	WT1	WD1	WD1	WWT1	WWT1	WWC1	WWC1
Prelate	Steier A.	WT1	WT1	WD1	WD1	WWT1	WWT1	WWC1	WWC1
Prince Albert	Altenberg D.	WT4		WD3		WWT3	WWT2	WWC3	
Prince Albert	Callaghan, K.	WT4		WD3	WD3	WWT3		WWC3	WWC3
Prince Albert	Carrier, AG	WT4		WD3	WD1	WWT3		WWC3	
Prince Albert	Graham, D.	WT4		WD3		WWT3	WWT3	WWC3	
Prince Albert	Grant, R.A.	WT4	WT4	WD3	WD3	WWT3	WWT2	WWC3	WWC3
Prince Albert	Hanson, R.	WT4	WT3	WD3		WWT3		WWC3	
Prince Albert	Hill, G.	WT4	WT2	WD3		WWT3		WWC3	
Prince Albert	Hodgson, RL.	WT4		WD3	WD2	WWT3		WWC3	WWC2
Prince Albert	Isbister R.D.	WT4		WD3		WWT3	WWT2	WWC3	
Prince Albert	Jobin L.	WT4	WT3	WD3	WD1	WWT3	WWT2	WWC3	
Prince Albert	Larocque, Y.	WT4		WD3	WD2	WWT3		WWC3	WWC2
Prince Albert	MacDonald G.	WT4	WT3	WD3		WWT3		WWC3	
Prince Albert	McBeath L.L	WT4		WD3	WD2	WWT3		WWC3	WWC2
Prince Albert	Polowski, R.	WT4	WT3	WD3		WWT3	WWT1	WWC3	
Prince Albert	Rennie D.H.	WT4		WD3	WD1	WWT3		WWC3	WWC1
Prince Albert	Thurston Brenda J.	WT4		WD3		WWT3	WWT2	WWC3	
Prince Albert	Vansil, D.A.	WT4	WT2	WD3		WWT3		WWC3	
Qu'Appelle	Wickenheiser, B.K.	WT1	WT1	WD1	WD1	WWT1		WWC1	
Quill Lake	Kroeker, R.	WT1	WT1	WD1	WD1	WWT1	WWT1	WWC1	WWC1
Radisson	Sirota S.G.	WT1	WT1	WD1	WD1	WWT1	WWT1	WWC1	WWC1
Radville	Sawyer G.	WT2	WT2	WD1		WWT1		WWC1	
Regina	Bater, K.W.	N/A		WD4		WWT4	WWT3	WWC4	
Regina	Bernhardt, L.S.	N/A		WD4		WWT4	WWT1	WWC4	
Regina	Brass, BG	N/A		WD4	WD1	WWT4		WWC4	
Regina	Dodds, DE	N/A		WD4	WD1	WWT4		WWC4	

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Regina	Drummond D.	N/A		WD4		WWT4		WWC4	WWC2
Regina	Eklund D.	N/A		WD4	WD2	WWT4		WWC4	
Regina	Fiorante, A.	N/A		WD4		WWT4	WWT2	WWC4	
Regina	Fries, A.	N/A		WD4		WWT4	WWT3	WWC4	
Regina	Griffin D.J.	N/A		WD4	WD2	WWT4		WWC4	
Regina	Gullickson H.	N/A		WD4	WD2	WWT4		WWC4	
Regina	Hauglum, S.J.	N/A		WD4	WD3	WWT4		WWC4	
Regina	Hubick G.	N/A		WD4		WWT4		WWC4	WWC1
Regina	Jelinski, R.	N/A		WD4		WWT4	WWT3	WWC4	
Regina	Kell, G.M.	N/A		WD4		WWT4	WWT1	WWC4	
Regina	Koroluk S.	N/A		WD4	WD2	WWT4		WWC4	
Regina	Krueger R.	N/A		WD4		WWT4	WWT2	WWC4	
Regina	Kyle, Wm.	N/A		WD4		WWT4		WWC4	WWC1
Regina	Lysack, Robt_B.	N/A		WD4	WD1	WWT4		WWC4	
Regina	Maddigon, DD	N/A		WD4	WD1	WWT4		WWC4	
Regina	Makuch, G.	N/A		WD4		WWT4		WWC4	WWC2
Regina	Mellom, L.J.	N/A		WD4		WWT4	WWT4	WWC4	
Regina	Miller B.	N/A		WD4		WWT4	WWT4	WWC4	
Regina	Moisiuk, G.	N/A		WD4		WWT4	WWT4	WWC4	
Regina	Moisuk, D.	N/A		WD4		WWT4	WWT4	WWC4	
Regina	Payne N.	N/A		WD4		WWT4		WWC4	WWC2
Regina	Rennebohm R.	N/A		WD4	WD1	WWT4		WWC4	
Regina	Rokosh W.S.	N/A		WD4	WD2	WWT4		WWC4	
Regina	Rostad B.	N/A		WD4	WD1	WWT4		WWC4	
Regina	Sebesten, B.	N/A		WD4	WD3	WWT4		WWC4	
Regina	Sinclair, D.J.	N/A		WD4		WWT4	WWT3	WWC4	
Regina	Sweeney, P.L.	N/A		WD4	WD2	WWT4		WWC4	
Regina	Ullrich, J.	N/A		WD4		WWT4		WWC4	WWC4
Regina	Wild, R.	N/A		WD4		WWT4	WWT4	WWC4	
Regina	Wilkie H.	N/A		WD4		WWT4		WWC4	WWC1
Regina	Willenborg V.	N/A		WD4	WD2	WWT4		WWC4	

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Regina	Wirth, BD.	N/A		WD4	WD1	WWT4		WWC4	
Rhein	Hilderman, B.	WT2	WT1	WD1	WD1	WWT1		WWC1	
Rhein	Solonenko RM	WT2	WT1	WD1	WD1	WWT1		WWC1	
Rockglen	Tucker G.	WT1	WT1	WD1	WD1	WWT1	WWT1	WWC1	WWC1
Rose Valley	Zwarych, D.	WT1	WT1	WD1	WD1	WWT1	WWT1	WWC1	WWC1
Rosthern	Aebig, C.N.	WT2	WT2	WD2	WD2	WWT1	WWT1	WWC2	WWC1
Rosthern	Neufeld, D.K.	WT2		WD2		WWT1		WWC2	WWC1
Rouleau	Mytopher, F.	WT1	WT1	WD1	WD1	WWT1	WWT1	WWC1	WWC1
Rowan's Ravine Provincial Park	Hansen, RO	WT1	WT1	N/A	WD1	WWT1		N/A	
Rowan's Ravine Provincial Park	Peesker R.W.	WT1	WT1	N/A	WD1	WWT1		N/A	
Rowans Ravine Provincial Park	Currie J.W.	WT1	WT1	N/A	WD1	WWT1		N/A	
Saltcoats	Nabozniak B.	WT1	WT1	WD1	WD1	WWT1		WWC1	
Sask Water - Water Plants	Jacobson, S.	WT3	WT3		WD1	N/A		N/A	
Sask Water - Water Plants	Bushell A.	WT3	WT1		WD2	N/A		N/A	
Sask Water Pipeline Hanley	Kroeger, L.	N/A		WD2	WD2	N/A		N/A	
Sask Water Pipeline Hanley	Zdunich MJ	N/A		WD2	WD2	N/A		N/A	
Sask Water Pipeline Saskatoon	Kennard, R.	N/A		WD2	WD2	N/A		N/A	
Sask Water Pipeline Saskatoon	Orchard, K.	N/A		WD2	WD2	N/A		N/A	
Sask Water Pipeline Watrous	Frey, D.			WD2	WD2	N/A		N/A	
Sask Water Pipeline Watrous	Sears, G.			WD2	WD2	N/A		N/A	
Sask Water Gravelbourg	Lucci T.	WT2	WT3	N/A		N/A		N/A	
Sask Water Gravelbourg	Rotheisler, R.	WT2	WT2	N/A	WD1	N/A		N/A	
Sask Water Melfort	Ballantyne, K.	WT3	WT2	N/A		N/A		N/A	
Sask Water Melfort	Ford J.	WT3	WT2	N/A		N/A		N/A	
Sask Water Melfort	Lang D.	WT3	WT3	N/A	WD1	N/A		N/A	
Sask Water Melfort	McGladdery, D.B.	WT3	WT3	N/A	WD1	N/A		N/A	
Sask Water Wakaw	Orb, D.L.	WT3	WT3	N/A	WD2	N/A		N/A	
Sask Water Wakaw	Reider M.	WT3		N/A	WD1	N/A		N/A	
Sask Water Wakaw	Standish, C.J.M.	WT3	WT2	N/A		N/A		N/A	
Sask. Landing Provincial Park	Carlson, BT	WT1	WT1	N/A	WD1	WWT1	N/A		
Sask. Landing Provincial Park	Johnson DT	WT1	WT1	N/A	WD1	WWT1	N/A		

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Sask. Landing Provincial Park	Lockman, D.	WT1	WT1	N/A	WD1	WWT1	N/A		
Sask. Landing Provincial Park	Shumaker, B.M.	WT1	WT1	N/A	WD1	WWT1	N/A		
Saskatoon	Arnold, C.	WT4	WT1	WD4	WD2	WWT4		WWC4	
Saskatoon	Cao, H.T.	WT4	WT2	WD4		WWT4		WWC4	
Saskatoon	Clifford, D.	WT4	WT3	WD4		WWT4		WWC4	
Saskatoon	Crawford, O.A.	WT4		WD4		WWT4	WWT4	WWC4	
Saskatoon	Dugas, G.R.	WT4	WT3	WD4		WWT4		WWC4	
Saskatoon	Fisher, C.E.	WT4		WD4		WWT4	WWT3	WWC4	
Saskatoon	Gross G.	WT4		WD4		WWT4	WWT2	WWC4	
Saskatoon	Halyk T.	WT4	WT2	WD4		WWT4		WWC4	
Saskatoon	Hanson K.W.	WT4		WD4		WWT4	WWT2	WWC4	
Saskatoon	Heuchert K.D.	WT4	WT2	WD4		WWT4		WWC4	
Saskatoon	Hogan, M.F.	WT4	WT2	WD4		WWT4		WWC4	
Saskatoon	Jackle, D. O.	WT4		WD4		WWT4	WWT3	WWC4	
Saskatoon	Keller, M.R.	WT4	WT4	WD4		WWT4		WWC4	
Saskatoon	Kosteniuk D.C.	WT4		WD4		WWT4	WWT2	WWC4	
Saskatoon	McWillie, E.	WT4		WD4		WWT4	WWT4	WWC4	
Saskatoon	Olson, B.D.	WT4	WT3	WD4		WWT4		WWC4	
Saskatoon	Pelletier, G.	WT4		WD4		WWT4	WWT1	WWC4	
Saskatoon	Pilot, H.	WT4	WT4	WD4		WWT4		WWC4	
Saskatoon	Simonot, M.	WT4		WD4		WWT4	WWT1	WWC4	
Saskatoon	Strouts J.	WT4	WT1	WD4		WWT4		WWC4	
Saskatoon	Torgerson, C.	WT4		WD4		WWT4	WWT2	WWC4	
Saskatoon	Wiebe, E.I.	WT4		WD4		WWT4	WWT1	WWC4	WWC2
Saskatoon	Wolf, R.A.	WT4	WT2	WD4		WWT4		WWC4	
Saskatoon	Wudrich, W.J.	WT4	WT2	WD4		WWT4		WWC4	
Saskatchewan Hospital Site	Anderson, W.	N/A		WD1	WD1	WWT1		WWC1	
Saskatchewan Hospital Site	Ayotte R.	N/A		WD1	WD1	WWT1		WWC1	
Sceptre	King, G.	WT1	WT1	WD1	WD1	WWT1	WWT1	WWC1	WWC1
Sedley	Mildenberger, K.L.	WT1	WT1	WD1	WD1	WWT1	WWT1	WWC1	WWC1
Shaunavon	Greve, Glenn	WT1	WT2	WD2	WD2	WWT1	WWT1	WWC2	WWC2

Community Facility Effective May 5, 2003	Certified Operator	Water Plant Classification	Operator Certified as:	Distribution System Classification	Operator Certified as:	Wastewater Facility Classification	Operator Certified as:	Collection System Classification	Operator Certified as:
Southey	Irwin, G.D.	WT1	WT1	WD1	WD1	WWT1		WWC1	
Springside	Schirrschmidt, L.	WT1	WT1	WD1	WD1	WWT1	WWT1	WWC1	WWC1
St. Benedict	Grilz L.	WT1	WT1	WD1	WD1	WWT1		WWC1	
St. Brieux	Grant, K.	WT1	WT1	WD1	WD1	WWT1	WWT1	WWC1	WWC1
St. Walburg	Knight, L.E.	WT2	WT2	WD1	WD2	WWT1	WWT1	WWC1	WWC2
Stanley Mission	Charles, P.A.	WT1	WT1	WD1	WD1	WWT1	WWT1	WWC1	WWC1
Stanley Mission	Roberts, G.N.	WT1	WT2	WD1	WD1	WWT1	WWT1	WWC1	WWC1
Stony Rapids	Duff A.	WT2	WT2	WD1	WD2				
Stoughton	Balon M.	WT1	WT1	WD1	WD1	WWT1	WWT1	WWC1	WWC1
Strasbourg	Brown, A.W.	WT1	WT1	WD1	WD1	WWT1		WWC1	
Sturgis	Poworoznyk, V.	WT1	WT1	WD1	WD1	WWT1	WWT1	WWC1	WWC1
Swift Current	Holland, R.	WT3	WT3	WD3		WWT1		WWC3	
Swift Current	Johnson, K.D.	WT3	WT4	WD3		WWT1		WWC3	
Swift Current	Nelson, D.	WT3	WT3	WD3		WWT1		WWC3	
Swift Current	O'Neill, K.M.	WT3	WT2	WD3		WWT1	WWT2	WWC3	
Swift Current	Rudd, D.	WT3	WT3	WD3		WWT1		WWC3	
Theodore	Dareichuk, D.N.	WT1	WT1	WD1	WD1	WWT1		WWC1	
Togo	Hamell, R.	WT1	WT1	WD1	WD1	WWT1		WWC1	
Tompkins	Mitchell K.	WT1	WT1	WD1	WD1	WWT1	WWT1	WWC1	WWC1
Turtleford	Chambers, A.H.	WT2	WT1	WD1	WD1	WWT1		WWC1	WWC1
Vanguard	Hornung, J.	WT1	WT1	WD1	WD1	WWT1	WWT1	WWC1	WWC1
Vibank	Moffatt, A.	WT1	WT1	WD1	WD1	WWT1	WWT1	WWC1	WWC1
Viscount	Leffler C.G.	WT2	WT1	WD1	WD1	WWT1		WWC1	
Vonda	Starosta M.R.	WT1	WT1	WD1	WD1	WWT1	WWT1	WWC1	WWC1
Wadena	Steedsman V.	WT2	WT2	WD2	WD2	WWT1	WWT1	WWC2	WWC2
Wakaw	Greschuk G.	WT1	WT1	WD1	WD1	WWT1		WWC1	
Wakaw	Vachon G.	WT1	WT1	WD1	WD1	WWT1		WWC1	
Wawota	Chorney, K.	WT2	WT2	WD1	WD1	WWT1		WWC1	
Weyburn	Fradette S.G.	WT3	WT2	WD2	WD2	WWT1		WWC2	
Weyburn	Holtz, G.E.	WT3	WT3	WD2	WD2	WWT1		WWC2	
Weyburn	Musk, D.	WT3		WD2	WD1	WWT1		WWC2	

Community Facility Effective May 5, 2003	Certified Operator	Water Plant Classification	Operator Certified as:	Distribution System Classification	Operator Certified as:	Wastewater Facility Classi fication	Operator Certified as:	Collection System Classification	Operator Certified as:
Weyburn	Paxman G.	WT3	WT2	WD2	WD1	WWT1		WWC2	
Weyburn	Szczecinski L.W.	WT3		WD2	WD2	WWT1		WWC2	WWC2
Weyburn	Ursu L.D.	WT3		WD2	WD2	WWT1	WWT1	WWC2	WWC2
Weyburn	Vandale D.W.	WT3		WD2	WD2	WWT1	WWT1	WWC2	WWC2
Weyburn	Vatamaniuck, R.J.	WT3		WD2	WD2	WWT1	WWT1	WWC2	WWC2
Weyburn	Williams T.	WT3	WT3	WD2	WD2	WWT1		WWC2	
Weyerhaeuser Canada	Harper, RF.	WT2	WT1	WD1	WD1	WWT1		N/R	
Weyerhaeuser Canada	Rowe, T.A.	WT2	WT2	WD1	WD1	WWT1		N/R	
White City	Reynolds B.	WT1		WD1		WWT1	WWT1	WWC1	WWC1
Wishart	Turner R.J.	WT1		WD1		WWT1	WWT1	WWC1	WWC1
Wolseley	Puffalt R.	WT1	WT1	WD1	WD1	WWT1		WWC1	
Wolseley	Veness M.	WT1	WT1	WD1	WD1	WWT1		WWC1	
Wynyard	Karakochuk, J.B.	WT2		WD2	WD2	WWT1		WWC2	
Wynyard	Popadynetz, L.	WT2	WT2	WD2	WD2	WWT1		WWC2	
Yarbo	Dick K.	WT2	WT2	WD1	WD1	WWT1		WWC1	
Yellow Grass	Hockley D.	WT1	WT1	WD1	WD1	WWT1	WWT1	WWC1	WWC1
Yorkton	Baluk, A.W.	WT2	WT1	WD3		WWT3		WWC3	
Yorkton	Bieber, B.	WT2	WT2	WD3		WWT3	WWT2	WWC3	
Yorkton	Buchholzer, M.J.	WT2	WT3	WD3	WD2	WWT3	WWT4	WWC3	WWC2
Yorkton	Colbow G.L.	WT2	WT2	WD3		WWT3		WWC3	
Yorkton	Mansuy, R.D.	WT2	WT2	WD3	WD2	WWT3	WWT2	WWC3	WWC2
Yorkton	Nikiforoff S.D.	WT2	WT2	WD3		WWT3	WWT3	WWC3	
Yorkton	Parachoniak, N.	WT2	WT2	WD3		WWT3		WWC3	
Yorkton	Schwartz, C.	WT2	WT2	WD3		WWT3	WWT3	WWC3	

N/A = Not Applicable
N/R = Not Rated Yet

Appendix 4
Canada-Saskatchewan Infrastructure Program
2002/2003 Approved and Announced Water and Sewer Projects

Community	Project	Total CSIP Contribution	Federal Share	Provincial Share
Town of Aberdeen	Upgrades to water system	$13,332	$6,666	$6,666
Village of Alsask	Upgrades to water treatment plant	$70,398	$35,199	$35,199
Village of Alvena	Upgrades to water pipeline	$8,026	$4,013	$4,013
RM of Antler	Construction of rural water pipeline	$6,350	$3,175	$3,175
RM of Arlington	Relocation of water well	$2,344	$1,172	$1,172
Village of Aylesbury	Upgrades of pumphouse and installation of new pump	$1,672	$836	$836
Village of Bradwell	Installation of chlorination system	$12,800	$6,400	$6,400
Village of Broderick	Construction of rural water pipeline	$48,346	$24,173	$24,173
Village of Cadillac *	Upgrades to water treatment plant	$24,720	$12,360	$12,360
Town of Delisle	Upgrades to water treatment plant	$149,006	$74,503	$74,503
Village of Domremy	Installation of two new water hydrants	$6,728	$3,364	$3,364
Village of Ernfold	Update chlorine pumps	$1,638	$819	$819
Village of Eyebrow	Construction of new water well	$754	$377	$377
Village of Fenwood	Upgrades to water treatment plant	$4,000	$2,000	$2,000
Village of Gerald	Upgrades to water treatment plant	$3,552	$1,776	$1,776
Village of Glenside	Upgrades to water treatment plant	$9,270	$4,635	$4,635
Village of Golden Prairie *	Upgrades to water treatment plant	$5,150	$2,575	$2,575
RM of Golden West	Construction of new water well	$5,218	$2,609	$2,609
Village of Goodsoil	Construction of a water treatment plant	$238,266	$119,133	$119,133
Village of Guernsey	Upgrades to water treatment plant	$4,848	$2,424	$2,424
Village of Halbrite	Upgrades to water treatment plant	$12,738	$6,369	$6,369
Village of Holdfast *	Installation of a water filtration system	$7,272	$3,636	$3,636
City of Humboldt	Replacement of watermains	$186,876	$93,438	$93,438
Resort Village of Katepwa	Construction of new water well	$5,760	$2,880	$2,880
Village of Kennedy	Maintenance of aquifer	$12,360	$6,180	$6,180
Village of Kenosee Lake	Upgrades to chlorination system	$28,290	$14,145	$14,145
Village of Killaly	Upgrades to water treatment plant	$7,072	$3,536	$3,536
Village of Kincaid	Construction of water treatment plant	$277,502	$138,751	$138,751
Village of Laird	Construction of two new water wells	$10,644	$5,322	$5,322
RM of Lakeland *	Upgrades to water treatment plant	$23,346	$11,673	$11,673
RM of Lakeview	Construction of new water well	$8,496	$4,248	$4,248
Village of Lancer	Upgrades to water filtration system	$6,660	$3,330	$3,330
Town of Leader	Upgrades to water treatment plant	$553,600	$276,800	$276,800
Village of Leoville	Construction of a stand-by water well	$12,580	$6,290	$6,290
Village of Liberty	Upgrades to water distribution pump	$10,666	$5,333	$5,333
RM of Longlaketon	Install filtration/chlorination equipment	$15,692	$7,846	$7,846
Town of Maidstone	Installation of new water supply system	$1,690,580	$845,290	$845,290
Village of Makwa	Upgrades to water treatment plant	$12,016	$6,008	$6,008
Town of Martensville**	Construction of new water reservoir and pumping station (2002/2003) (2003/2004)	 $315,614 $547,362	 $157,807 $273,681	 $157,807 $273,681
Village of Maymont	Upgrades to water treatment plant	$6,564	$3,282	$3,282
RM of Meeting Lake	Enhancement of water supply	$20,600	$10,300	$10,300
City of Melville	Construction of new water well	$186,666	$93,333	$93,333
RM of Meota	Chlorination and filtration of well water	$10,314	$5,157	$5,157
Town of Milestone	Upgrades to water supply system	$12,360	$6,180	$6,180
Village of Mistatim	Upgrades to water supply system	$23,346	$11,673	$11,673

RM of Monet	Renovations to water loading facility	$9,028	$4,514	$4,514
City of Moose Jaw	Improvements to water pressure	$133,900	$66,950	$66,950
Village of Netherhill	Construction of reservoir and loading facility	$6,112	$3,056	$3,056
Village of Pierceland	Upgrades to lift system	$11,848	$5,924	$5,924
Village of Plunkett	Upgrades to water treatment plant	$9,822	$4,911	$4,911
Town of Porcupine Plain	Upgrades to water treatment plant	$84,570	$42,285	$42,285
RM of Reciprocity	Upgrades to community wells	$11,600	$5,800	$5,800
City of Regina**	Replacement of water meters (2002/2003) (2005/2006)	 $1,078,942 $1,087,232	 $539,471 $543,616	 $539,471 $543,616
City of Regina	Pipeline	$7,851,800	$3,925,900	$3,925,900
Village of Rhein	Upgrades to water treatment plant	$9,058	$4,529	$4,529
Village of Riverhurst	Construction of water treatment plant	$305,190	$152,595	$152,595
Village of Ruddell	Construction of new water cistern	$3,596	$1,798	$1,798
Village of Rush Lake	Install water and sewer curb valves	$13,210	$6,605	$6,605
RM of Sarnia	Upgrades to water treatment plant	$8,926	$4,463	$4,463
Village of Sceptre	Construction of new water well	$10,162	$5,081	$5,081
Village of Senlac	Upgrade and construction of water wells	$12,362	$6,181	$6,181
Village of Shamrock	Installation of water filter system	$2,112	$1,056	$1,056
Village of St. Benedict	Upgrades to water treatment plant	$4,236	$2,118	$2,118
Village of St. Brieux	Upgrade to water main and shut off valves	$10,300	$5,150	$5,150
Village of St. Victor	Upgrades to water treatment plant	$54,932	$27,466	$27,466
Town of Stoughton	Replacement of water wells	$12,634	$6,317	$6,317
RM of Tecumseh	Construction of new water well	$10,986	$5,493	$5,493
Resort Village of Tobin Lake	Installation of water distribution system	$284,012	$142,006	$142,006
Village of Waldron	Construction of water purification system	$3,840	$1,920	$1,920
Village of Weirdale	Installation of water hydrant	$2,266	$1,133	$1,133
Village of Welwyn	Upgrades to water treatment plant	$2,610	$1,305	$1,305
City of Weyburn	Replacement of watermain	$266,426	$133,213	$133,213
RM of Wheatlands	Upgrades to water treatment plant	$52,230	$26,115	$26,115
City of Yorkton	Construction of water pipeline	$252,000	$126,000	$126,000
	Total Water Supply (74)	**$16,227,336**	**$8,113,668**	**$8,113,668**

Village of Alida	Upgrades to waste water equipment	$4,200	$2,100	$2,100
Village of Brock	Upgrade to sewer lift station	$3,090	$1,545	$1,545
Village of Buchanan	Upgrades to sewer lagoon	$11,500	$5,750	$5,750
Village of Coleville	Upgrades to sewer lagoon	$36,392	$18,196	$18,196
Resort Village of Echo Bay	Construction of new regional sewage lagoon	$84,640	$42,320	$42,320
Village of Edam	Upgrades to sewage lagoon	$144,200	$72,100	$72,100
RM of Emerald	Upgrades to water plant	$6,528	$3,264	$3,264
Town of Fort Qu'appelle**	Construction of new sewage lagoon (2002/2003) (2003/2004)	 $224,000 $1,481,000	 $112,000 $740,500	 $112,000 $740,500
Village of Grand Coulee	Upgrades to sewage lagoon	$84,186	$42,093	$42,093
Resort Village of Kannata Valley	Construction of new sewage lagoon	$211,196	$105,598	$105,598
Village of Lake Lenore	Expansion of sewage lagoon	$95,040	$47,520	$47,520
Resort Village of Manitou	Upgrades to sewage line and pump	$59,738	$29,869	$29,869

Village of Manor	Upgrades to sewage lift station	$6,894	$3,447	$3,447
Village of Middle Lake	Replace sewage pump	$6,866	$3,433	$3,433
City of Moose Jaw	Upgrades to irrigation drainage	$66,950	$33,475	$33,475
Village of Neville	Upgrades to sewage lagoon	$4,326	$2,163	$2,163
Village of Paddockwood	Upgrades to sewage lagoon	$59,576	$29,788	$29,788
Village of Roche Percee	Upgrades to sewage lagoon	$5,286	$2,643	$2,643
Village of Sedley	Upgrades to sewage lagoon	$20,480	$10,240	$10,240
Village of Smiley	Upgrade lift station	$2,644	$1,322	$1,322
Village of St. Louis	Construction of new secondary treatment facility	$79,268	$39,634	$39,634
Village of Strongfield	Upgrades to sewage lagoon	$3,020	$1,510	$1,510
Town of Turtleford	Construction of new sewage lagoon	$309,000	$154,500	$154,500
Town of Watson	Upgrade sewer lift station	$6,866	$3,433	$3,433
RM of Waverly	Upgrade lift station and sewage lagoon	$7,760	$3,880	$3,880
Village of Weldon	Upgrades to sewage lagoon	$5,012	$2,506	$2,506
City of Weyburn	4th Street Storm Sewer	$133,332	$66,666	$66,666
City of Weyburn	Twinning Sanitary Sewer Lines	$333,032	$166,516	$166,516
	Total Waste Water (28)	**$3,496,022**	**$1,748,011**	**$1,748,011**

Northern Village of Air Ronge**	Upgrades to water treatment plant and sewage pumping station (2002/2003) (2003/2004)	 $48,666 $218,000	 $24,333 $109,000	 $24,333 $109,000
Northern Village of Beauval *	Expansion of sewage lagoon and pump station	$206,000	$34,334	$171,666
Northern Village of Cole Bay*	Upgrades to water and sewer systems	$50,000	$8,334	$41,666
Northern Town of Creighton	Upgrades to pumping station and pipeline	$100,000	$16,667	$83,333
Northern Village of Denare Beach	Upgrades to sewage treatment plant	$118,000	$19,668	$98,332
Northern Village of Ile a la Crosse *	Upgrades to water and sewer systems	$84,000	$14,000	$70,000
Northern Village of Jans Bay*	Upgrades to water supply system	$30,666	$5,111	$25,555
Northern Village of La Loche * **	Upgrades to water and sewer systems (2002/2003) (2003/2004)	 $166,666 $500,000	 $27,778 $83,333	 $138,888 $416,667
Northern Town of La Ronge	Upgrades to water treatment plant	$920,000	$153,334	$766,666
Northern Hamlet of Michel Village *	Upgrades to water and sewer systems	$83,332	$13,890	$69,442
Northern Hamlet of Patuanak *	Upgrades to water treatment plant	$20,000	$3,334	$16,666
Northern Settlement of Wollaston *	Upgrades to water and sewer systems	$64,000	$10,668	$53,332
	Total Northern Water and Waste Water (12)	**$2,609,330**	**$523,784**	**$2,085,546**

	Total (114)	$22,332,688	$10,385,463	$11,947,225

Note: *Withdrawn **Multi-year project

Appendix 5
Northern Water and Sewer Projects
Expenditures for 2002-2003

Northern Water and Sewer Projects

Community	Funding Provided in 2002-2003
Towns	
Creighton	$ 192,927
La Ronge	120,237
Villages	
Air Ronge	207,777
Beauval	155,465
Buffalo Narrows	13,190
Cole Bay	13,223
Cumberland House	80,005
Denare Beach	261,333
Green Lake	131,671
Ile A La Crosse	25,029
Jans Bay	1,379
La Loche	64,220
Pelican Narrows	185
Pinehouse	211,165
Hamlets	
Patuanak	3,787
St. George's Hill	97,963
Stoney Rapids	1,795,157
Timber Bay	24,857
Turnor Lake	279,955
Settlements	
Bear Creek	629,037
Black Point	13,959
Brabant Lake	587,533
Camsell Portage	19,182
Descharme Lake	8,347
Garson Lake	49,071
Sled Lake	1,328,266
Uranium City	15,642
Total	**$6,330,562**

Appendix 6

Northern Water and Sewer Projects Funded under the Emergency Repair Program in 2002-2003

Community	Funding Provided in 2002-2003
Villages	
Buffalo Narrows	$ 3,153
Cumberland House	47,832
Denare Beach	12,024
Green Lake	4,235
ILa A La Crosse	39,578
Jans Bay	123
Sandy Bay	30,760
Hamlets	
Dore Lake	40,229
Michel Village	2,651
Patuanak	7,788
Turnor Lake	9,766
Weyakwin	879
Total	**$199,018**

Appendix 7
Summary of North Battleford Commission of Inquiry Recommendations, Actions and Status of Implementation (As of March 31, 2003)

Commission Recommendations	Government Action Taken	Status
1. That the criteria for surface water treatment plants reporting to SERM be standardized for the province, and not different between EcoRegions.	Section 39 (testing and reporting) and 42 (operational records and logs) of *The Water Regulations* – requirement for standardized reporting, monitoring and testing. SE is also standardizing its own inspection, permitting and record keeping protocols for use across EcoRegions.	Complete. Effective following passage of regulation in December 2002.
2. That the City of North Battleford commence construction for a new sewage treatment plant at a location downstream from the surface water treatment plant by no later than the spring of 2003.	SE working with City and Engineering Consultant to assess project requirements	Project still in design stage – pre-design report behind schedule. SE attempting to obtain commitment for construction start date.
3. Each permit to operate a surface water treatment plant should require as a condition to operate that there exist a quality control/quality assurance written policy in place that is acceptable to the regulator.	Subsection 43(1) of *The Water Regulations* – requirement that all communities have a QA/QC program.	QA/QC policy required by regulation as of December 31st, 2003. Will include in permits as new permits are issued.
4. That each permit to operate a surface water treatment plant specify as a condition for operation the record system that shall be maintained within the plant, and also specify a monthly internal review process to ensure that operating parameters within the permit are consistently being met.	Subsection 43(2) of *The Water Regulations* – requirement that permittee review records and logs pursuant to 42 on a monthly basis. SE's new operating permit template developed and to be used for all waterworks includes record keeping and monthly review requirements.	Monthly record review required by regulation effective December 31st, 2003. Will include in permits as new permits are issued.
5. That the City of North Battleford prepare a written safe drinking water policy that commits to the principle of quality of water over quantity of water, that commits to maintaining best industry practices in its water treatment plants, and that encourages the manager of the water treatment plant to report directly to city council whenever he has concerns that affect the safety of drinking water which are not being addressed by city administration officials.	Not directly applicable to Saskatchewan. North Battleford has provided SE with a draft safe water policy for review. SE provided comments; NB has not provided final draft.	Safe Drinking Water Policy has been prepared and submitted to City Council.
6. That one of the committees of city council be assigned responsibility for implementing the city's safe drinking water policy.	Not directly applicable to Saskatchewan, although SE is following up on this recommendation.	City Committee has assigned the Public Works Committee this responsibility.
7. That this committee receive from the manager of the water treatment plant a written report quarterly on the operations of the water treatment plant during the previous three months. Said report should include the results of all sampling conducted during the period, any non-compliances with the operating permit, and any other types of problem that an oversight committee would be interested in hearing.	Not directly applicable to Saskatchewan, although SE is following up on this recommendation. Department presently receives monthly reporting on operation of the surface WTP.	A report has been provided of the past three quarters of 2002.
8. That the subcommittee of council prepare a report annually for city council on the state of drinking water in the city, which report shall be part of the public record.	Not directly applicable to Saskatchewan, although SE is following up. SE regulations now state all communities notify consumers served on water quality and sample submission compliance.	City has advised that the City is planning to develop a report of this nature.
9. That the City of North Battleford raise its water utility rates at least to the median level of the rates charged by the thirteen Saskatchewan cities.	Not directly applicable to Saskatchewan, although SE is tracking this recommendation.	Rates have been raised and flat fees for water sewer infrastructure have been added. As of March 2003, water rates are above median levels.

Commission Recommendations	Government Action Taken	Status
10. That in the future the performance requirements expected of a surface water treatment plant be itemized in its permit to operate, and include not only the parameters to be met, but also the quality assurance and quality control procedures that are to be in place.	SE currently developing new operating permit template that will include these elements. Also see subsection 43(1) of *The Water Regulations* – requirement that all communities have a QA/QC program.	Implementation underway with development and ongoing delivery of new permits through to fall 2003.
11. To better ensure that surface water treatment plants remain capable in both infrastructure and operations year after year, that they be inspected by the regulator at least biannually by a person knowledgeable in surface water treatment best industry practices. This inspection should include: a record review to determine the level of compliance with the parameters for performance and sampling requirements set out in the permit; a review of the plant's processes and their operational effectiveness; an interview with the manager; and an interview with at least one operator. (a) That a detailed inspection report be produced that records any non-compliance with permit requirements, recommends any improvements to be made and a timetable for the same, and offers an overall grading of where the plant fits in the spectrum of quality for surface water treatment plants. (b) That a copy of the inspection report be delivered to the manager of the plant, to the city commissioner or his or her equivalent, and to the medical health officer for the health district.	Currently in place based on LTSDWS – funding for inspection staff provided in 2002/2003 budget. Present inspection frequency is two times per year for surface water plants, groundwater plants serving population of greater than 500 and small groundwater treatment plants that represent an elevated risk; one inspection per year at all other waterworks and sewage works. Staff training protocol completed and staff refresher training in waterworks technical operations and compliance/enforcement was complete by mid-December 2002. Inspection protocol developed and calls for delivery of copy of inspection report to listed parties. Waterworks safety assessment protocol/methodology developed to allow SE to provide overall ranking of waterworks.	Inspection protocol, which addresses these issues, was developed and implemented. Copies of inspection forms are provided to Health Regions (MHO's or PHI's).
12.That the City of North Battleford in the next six months: (a) install a supervisory control and data acquisition system (SCADA) in the surface water treatment plant; (b) retain a management consultant to assess the adequacy of the management component and the operator component of the plants department and to report within a further two months. It is recommended the report produced be tabled at city council as a public document, and a copy provided to SERM; and (c) commission an engineering study to determine if the city's reservoir capacity is adequate, bearing in mind the desirable goal of not operating the surface water treatment plant for short periods of time only.	Not directly applicable to Saskatchewan, although SE is tracking this recommendation.	(a) SCADA system not installed, engineering study being performed. Tender for SCADA anticipated early 2003. (b) Management study done SE received report end of March 2003 and is reviewing. c) Engineering study of reservoir has not been done yet.
13. That the Government of Saskatchewan approve SERM's request to fund an integrated provincial water quality database in the fiscal year 2002-03.	Based on LTSDWS – funding for year one provided in 2002/03. Covers drinking water portion of system.	Development currently in progress – Full implementation by end of 2003/2004. Drinking water portion will be on line May 2003
14. That the new data system incorporate the permit requirements for each licensee with a flagging system to identify communities that have not submitted the required samples and produce a printout on a weekly basis of all such non-compliances. (a) That all non-compliances be followed up, within seven days, with the chief municipal administrator or his or her designate, who may not be the manager or other person operating the water treatment facility. (b) That with respect to a missed bacteriological sample, the municipality be advised to submit one within seven days. In the event the municipality fails to do so a PDWA be issued.	Based on LTSDWS – funding for drinking water project component provided in 2002/2003 budget. Until computer system is operational, compliance tracking is manual (daily for bacteriological sample result tracking and quarterly for other parameters).	Manual tracking, notification and follow-up currently in place. Progress on automated system stated above. (b) Once adequate computer tracking system is in place, this will be possible and performed.

Commission Recommendations	Government Action Taken	Status
15. That in the event of persistent non-compliance by a municipality with respect to bacteriological sampling requirements, the regulator should appoint new management (see page 288), or should rescind the permit to operate the facility.	Sections 30, 31 and 32 of *EMPA, 2002* – provides the Minister with authority to take action necessary to protect human health.	Implemented as required with October 1, 2002 proclamation of *EMPA*
16. That a provincial protocol for water-borne disease investigation be prepared, distributed, and adopted by all health districts in the province and that this protocol include: (a) the establishment of a task force in each district which is to be notified by the medical health officer, or in his/her absence a public health inspector, whenever the health district is experiencing an enteric disease outbreak that could be caused by a water-borne pathogen; (b) that this protocol emphasize that the first hypothesis to be tested is whether or not it could be a water-borne pathogen, which means automatically checking with personnel at the water treatment facilities and with the regulator who should have a member on the task force; (c) when cases appear which are geographically close to a regional centre such as North Battleford that any additional persons or family members identified by the confirmed case who have also experienced a similar illness be interviewed in detail as to when and where they have consumed water for the period of at least ten days before the onset of illness; (d) that if the enteric disease reporting form is to continue to be used as a routine form, a new, much more detailed, form be available for use by investigators whenever the investigation involves a possible outbreak of water-borne disease; and (e) when in any health district there is a difference of opinion or uncertainty based on the available evidence as to whether or not a PDWA or boil water order should be issued after consultation with the task force, the medical health officer should contact forthwith the provincial public health officer or deputy minister to seek advice.	The Communicable Disease Control Manual used by the HRs has been revised to address (a)(b)(c) and (e) of this recommendation. 16(d) is currently being worked on.	Complete. Revisions sent to the HRs in February 2003. 16(d) to be completed and distributed to the HRs by April 15, 2003. Subsequently this has been completed
17. That each health district establish sentinel pharmacies to report any increase in anti-diarrheal medications. This is recommended by the Centres for Disease Control and Prevention in Atlanta, Georgia, and seems necessary when so many patients experiencing enteric disease self-medicate. This alert can also result in a request to physicians to increase stool sampling.	SH and HR MHOs have discussed the effectiveness of establishing sentinel pharmacies that will be used in surveillance of water borne illness in the province. It is felt that a more effective alternative is for the MHOs to communicate with local pharmacists when investigating possible outbreaks that may be associated with water.	By April 15, 2003 a letter will be sent from the SH-Chief Medical Health Officer to Saskatchewan pharmacists requesting them to advise the local MHO of any unusual increase of purchases of anti-diarrheal medications.
18. That a provincial protocol be developed for use by all health districts as to when stool samples should be requested from a patient and forwarded to a laboratory. The inquiry did not hear enough medical evidence to determine what such protocol should be, but clearly in this case there were not enough stool samples taken and the ability to diagnose disease was hampered.	The Communicable Disease Control Manual used by the HRs has been revised.	Complete. Revisions sent to the HRs in February 2003.
19. That the provincial Department of Health prepare for distribution to all health districts guidelines, including sample documents where appropriate, for all action to be taken by a health district once a PDWA or a boil water order is issued. The guidelines should cover the points outlined in the memorandum dated October 2, 2000 prepared by the public health inspectors. (See page 190).	A SH, HR and SE committee is developing procedures/guidelines to address this recommendation. These procedures/guidelines will be included in the Bacteriological Follow-up Protocol for Waterworks Regulated by SE.	This work will be completed and circulated by end of April 30, 2003.

Commission Recommendations	Government Action Taken	Status
20. That each health district put in place a system that requires: (a) that all reports from laboratories identifying enteric disease be reviewed daily between Monday and Friday, whether the communicable disease coordinator is present at work or not; (b) that instances of enteric disease be recorded in the communicable diseases log on the date the result is submitted, not the date a person recorded it; (c) that one public health inspector assume the primary role for investigating enteric disease, with a designated alternate for when the 'primary investigator is not available; (d) that the primary and alternate investigator receive training additional to other public health inspectors in the investigation of enteric disease, and in particular in interviewing techniques; and (e) that each district establish a contingency plan that will mobilize a number of additional persons to the investigation team in the event of an outbreak. The logical persons to be so added would be public health nurses who also have some training in interviewing techniques.	The Communicable Disease Control Manual used by the HRs has been revised. SH has also written the regions on specific items.	Completed in February 2003.
21. That public health officers for the health districts be briefed annually by a SERM representative for the purpose of learning the state of water treatment systems in the district, and what the potential may be for problems that might lead to disease.	Internal protocol development between the SH and SE. Formal briefings for HR officials being planned.	PHI or MHO's sent copies of inspection reports. Meeting of SE and SH region staff. Bacteriological Follow-up Protocol developed and a focal point of the working relationship.
22. That the provincial government take steps to ensure a better supply of public health inspectors in the province of Saskatchewan. These steps should include either greater educational opportunity for persons wishing to become public health inspectors to be educated in the province, or financial assistance for those persons who must leave the province to obtain the appropriate education.	A new contract between SAHO and Health Science Association has been signed. Increased compensation for public health inspectors is expected to help with recruitment and retention. The number of SH bursaries available to students interested in becoming a public health inspector has increased. Six inspector bursaries were available in 2002/2003 but only four were awarded. (Of the nine applicants, five weren't eligible). SH and Saskatchewan Learning are helping Saskatchewan Indian Federated College (SIFC) promote SIFC's Environmental Health Sciences Degree Program. Graduates from this program are eligible to sit a national examination qualifying them to work as a public health inspector.	Ongoing
23. That in the future, if SERM wishes to bring to the attention of operators information it considers important, it do so by letter or bulletin, stating the information and why it is important.	Binder containing all revised legislation, fact sheets, and important operational information prepared and printed. Bulletins and direct delivery of information will be used in the future.	Binder delivered to each waterworks commencing March 2003

Commission Recommendations	Government Action Taken	Status
24. That the government amend the operator certification regulations to provide that, after the first renewal, each operator must take a certain number of continuing education credits to qualify for the second renewal, and each renewal thereafter.	Section 68 of *The Water Regulations* – requirement to obtain continued education before certification renewal period.	Regulations in place and take effect for continuing operator education July 15th, 2005. Those operators re-certifying post-July 2005 must start to obtain renewal credits (CEU) beginning July 15, 2003.
25. That the government ensure there are sufficient continuing education courses available to meet the needs of operator continuing education.	Currently in place based on LTSDWS	Implemented
26. That EMPA be amended to: (a) establish a separate drinking water quality unit in SERM, whether it is a called a branch, a directorate or a section, with its own "director"; (b) provide the unit with all of the jurisdiction EMPA currently provides SERM over waterworks and, in addition, provide the unit with a mandate and jurisdiction to protect watershed and groundwater sources of drinking water; (c) provide that within the unit there exist a separate compliance section; and (d) provide that the unit produce an annual report to the legislature on the state of drinking water quality in the province.	**(a)** Drinking Water Quality Section formed under SE **(b)** SE's DWQS and Regional Operations have *EMPA* and regulatory jurisdiction over waterworks and sewage works. Construction approval process transferred from *The Saskatchewan Water Corporation Act* to *EMPA (2002)*. SWA was created under the mandate of SE by proclamation of *The Saskatchewan Watershed Authority Act* on October 1, 2002, with a mandate for source water protection including protecting the supply and quality of surface and groundwater. SWA reports to the Deputy Minister of SE and works in a closely integrated fashion with SE. (c) Enforcement officer position staffed and separate compliance and enforcement section formed (d) Section 19 of *EMPA (2002)* – Requires annual reporting to the Legislative Assembly	(a) Implemented as of July 2002 (b) Implemented effective October 1, 2002 (c) Implemented (d) Requirement legislated, report pending July 2003 for the 2002-03 fiscal year
27. That the regulator pursue a comprehensive inspection policy of water treatment facilities and apply a rigorous abatement-enforcement compliance policy on all water treatment facilities.	Currently in place based on LTSDWS, Inspection Protocol developed and formal Compliance and Enforcement Protocol developed.	Inspection protocol implemented. Compliance and enforcement protocol implemented.
28. That *The Water Pollution Control and Waterworks Amendment Regulations* be amended: (a) to provide that in the event of persistent non-compliance by a municipality, the regulator may order the replacement of the existing management or operators and may temporarily hire replacements as required at the municipality's expense; and (b) to make it an offence to knowingly operate a water treatment facility in contravention of the operational requirements set out in the operating permit.	Sections 30, 31 and 32 of *EMPA, 2002* – provides the Minister with authority to take recommended actions and other necessary to protect human health.	(a) Implemented as a component of *EMPA (2002)* rather than revisions to the regulations. (b) Implemented as a component of *EMPA (2002)* rather than revisions to the regulations.

Glossary of Acronyms

ADF Committee	Agriculture Development Fund
AO	Aesthetic Objective
APF	Agriculture Policy Framework
BAP	Benzo(a)pyrene
CEU Module	Continuing Education Unit
CSIP	Canada-Saskatchewan Infrastructure Program
CWQI and	Canadian Water Quality Index
DWQS	Drinking Water Quality Section
EBWO	Emergency Boil Water Order
E. coli	*Escherichia coli* (specifically *E. coli* 0157-H7)
EMPA Association	*The Environmental Management and Protection Act, 2002*
EMS	Environmental Management System
EPB	Environmental Protection Branch
EPOs Corporation	Environmental Project Officers
ES Management	Environmental Services
ESQUADAT	Environment Saskatchewan Quality Data
GRAA	Government Relations and Aboriginal Affairs
H&T	Health and Toxicity
HR Association	Health Region
ILOs	Intensive Livestock Operations
ITO	Information Technology Office
IMAC	Interim Maximum Acceptable Concentration
LGS Ltd.	an IBM company
LIMS	Laboratory Information Management System
LMT	Lacks Minimum Treatment
LoU	Letter of Understanding
LTDWS	Long Term Drinking Water Strategy
MAC	Maximum Acceptable Concentration
MHOs	Medical Health Officers
N/A	Not Applicable
NB	North Battleford
N/R	Not Rated
NOV	Notice of Violation
NTU	Nephelometric Turbidity Unit
OCB	Operator Certification Board
PDWA	Precautionary Drinking Water Advisory
PHIIS	Public Health Inspector Information System
PHO	Public Health Officials
PL	Provincial Laboratory
PSA	Public Service Announcement
QA/QC	Quality Assurance and Quality Control
RM	Rural Municipality
SAFRR	Saskatchewan Agriculture, Food and Rural Revitalization
SARM	Saskatchewan Association of Rural Municipalities
SCADA	Supervisory Control and Data Acquisition System
SCWMC	Spirit Creek Watershed Monitoring
SE	Saskatchewan Environment
SERM	Saskatchewan Environment and Resource Management (former department name)
SFMP Tanks	Site Facility Management Program
SH	Saskatchewan Health
SIAST	Saskatchewan Institute of Applied Science Technology
SIFC	Saskatchewan Indian Federated College
SPWA	Saskatchewan Public Works Association
SUMA	Saskatchewan Urban Municipalities
SW	SaskWater
SWA	Saskatchewan Watershed Authority
SWCC	Saskatchewan Wetland Conservation
SWIM	Saskatchewan Water Information
SWS	Small Water Systems
SWQI	Saskatchewan Water Quality Index
SWQO	Surface Water Quality Objectives
SWWA	Saskatchewan Water and Wastewater
SWWS	Small Wastewater Systems
THMs	Trihalomethanes
TQWM	Total Quality Water Management
WD-I	Water Distribution - Class I
WD-II	Water Distribution - Class II
WD-III	Water Distribution - Class III
WD-IV	Water Distribution - Class IV
WED	Western Economic Diversification
WT-I	Water Treatment - Class I
WT-II	Water Treatment - Class II
WT-III	Water Treatment - Class III
WT-IV	Water Treatment - Class IV
WMF	Water Management Framework
WQI	Water Quality Index
WTP	water treatment plant
WWC-I	Wastewater Collection - Class I
WWC-II	Wastewater Collection - Class II
WWC-III	Wastewater Collection - Class III
WWC-IV	Wastewater Collection - Class IV
WWT-I	Wastewater Treatment - Class I
WWT-II	Wastewater Treatment - Class II
WWT-III	Wastewater Treatment - Class III
WWT-IV	Wastewater Treatment - Class IV

Glossary of Symbols/Measurements

mg/L	milligrams per Litre
ug/L	micrograms per Litre

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